

DANMARKS  
NATIONALBANK

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# The drivers, implications and outlook for inflation

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2 November 2022

# Agenda

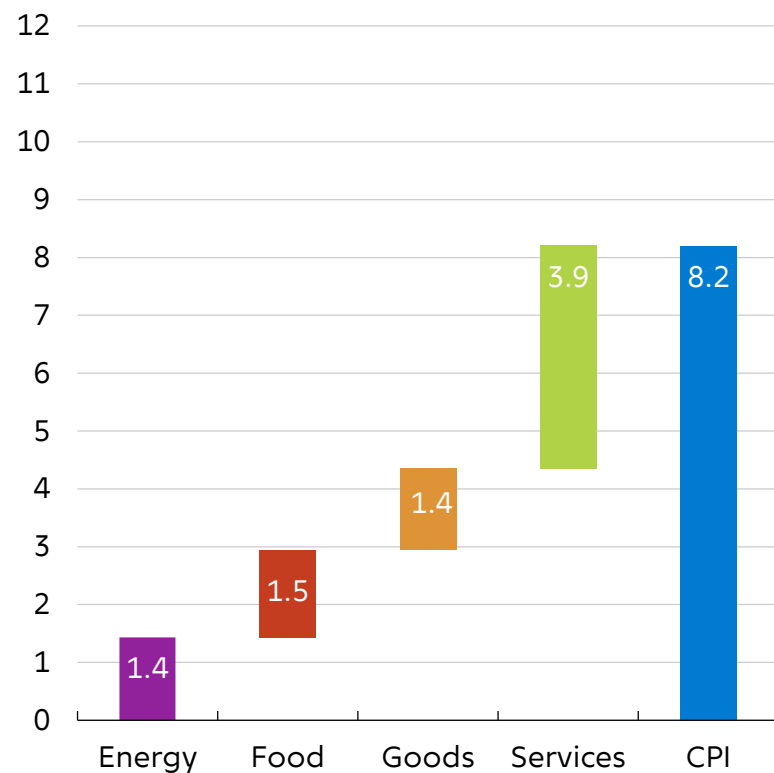
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- Where are we now?.....p.3
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- A special focus on DK .....p.17
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- Comparison to the 1970s.....p.25
- Conclusion.....p.31

# Where are we now?

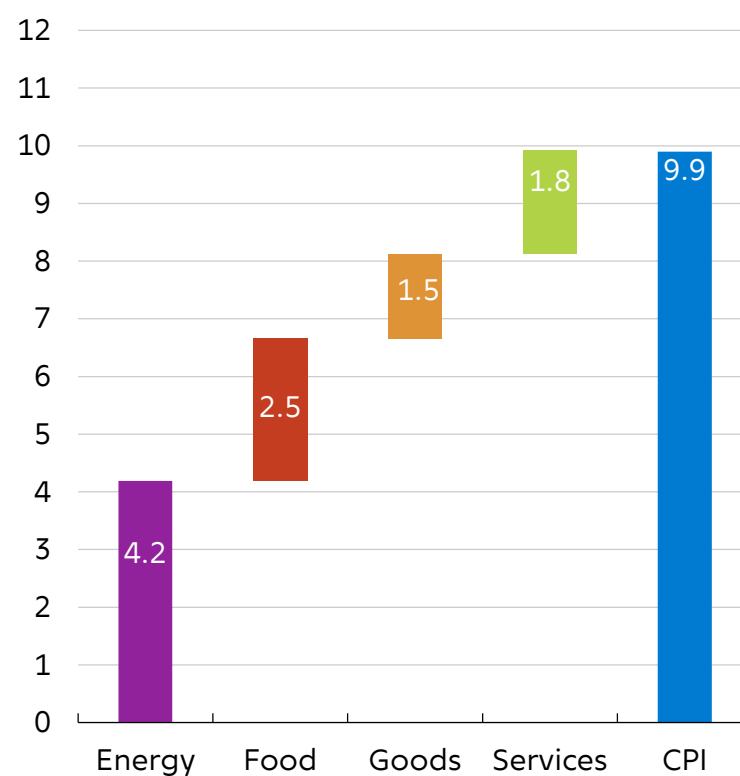
## Inflation in services contributes most to US inflation

Contribution to yearly growth in CPI, pp



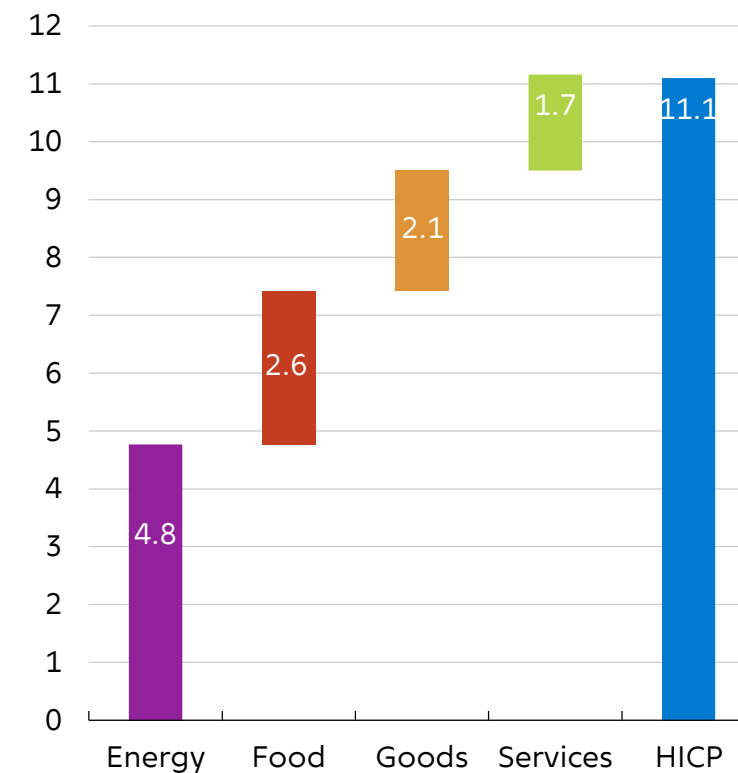
## Energy is the largest driver in the euro area...

Contribution to yearly growth in HICP, pp



## ... and in Denmark

Contribution to yearly growth in HICP, pp

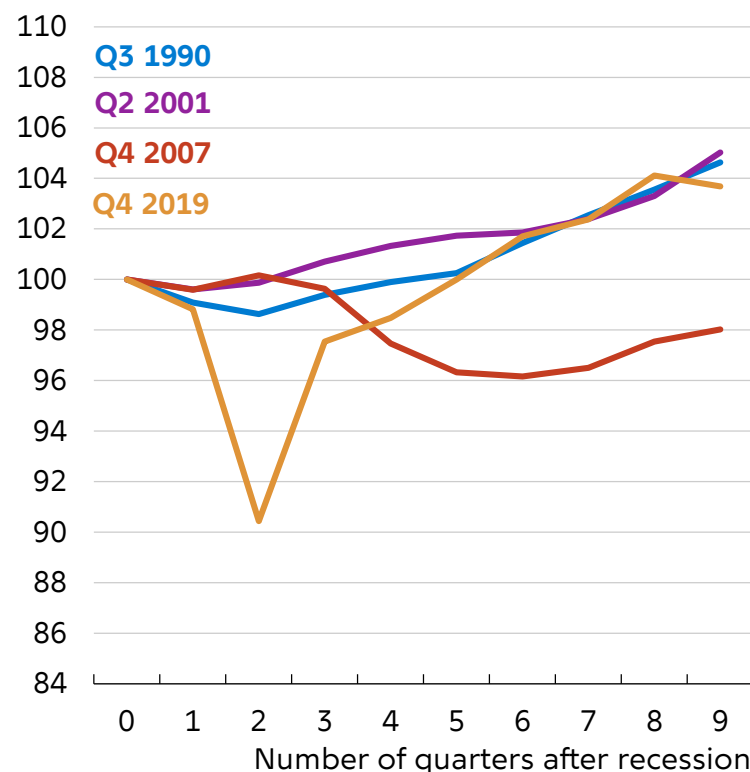


Note: CPI and HICP decomposed with growth contribution. Data is from September.  
Source: Macrobond.

# Why – 1) The recovery was much faster than from previous crises due to the nature of the crisis.. (Theory: Phillips curve - both level and change in output gap matters, possible non-linearity)

## USA, GDP

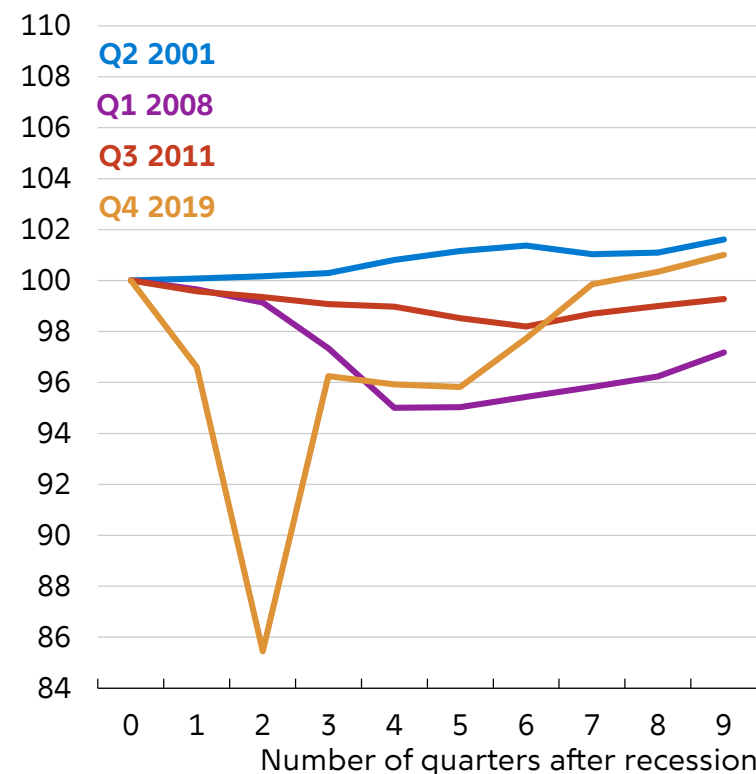
Index, 1 quarter prior to recession = 100



Note: The time period for the recession are defined by NBER.  
Source: Macrobond.

## Euro area, GDP

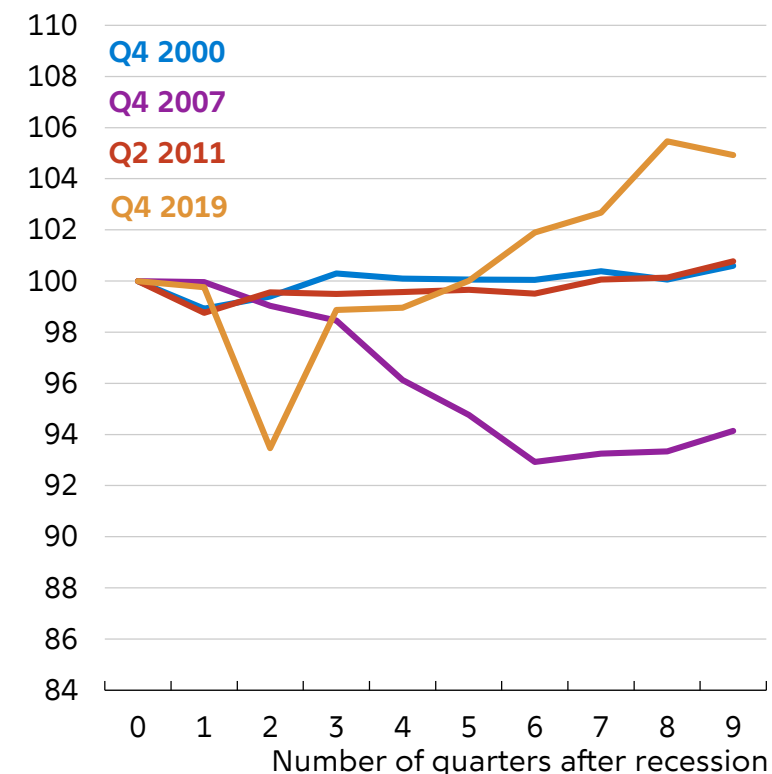
Index, 1 quarter prior to recession = 100



Note: The time period for the recession are defined by OECD.  
Source: Macrobond.

## Denmark, GDP

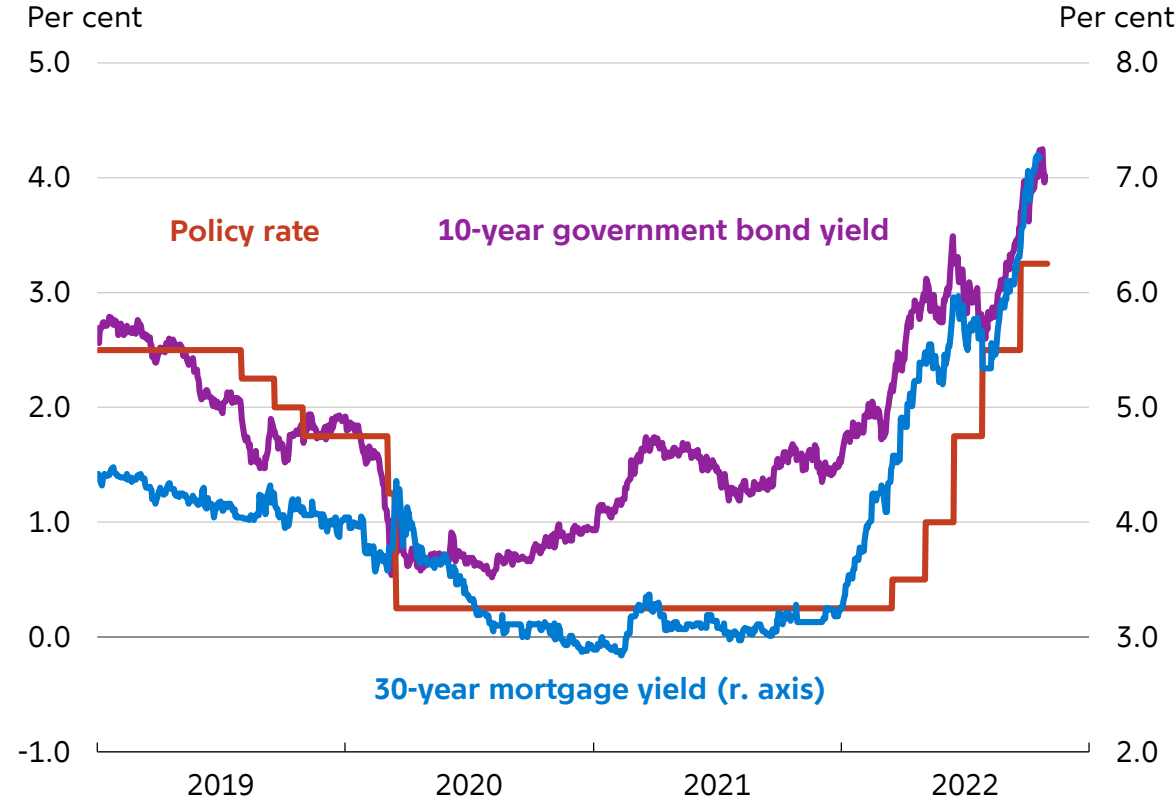
Index, 1 quarter prior to recession = 100



Note: The time period for the recession are defined by OECD.  
Source: Macrobond.

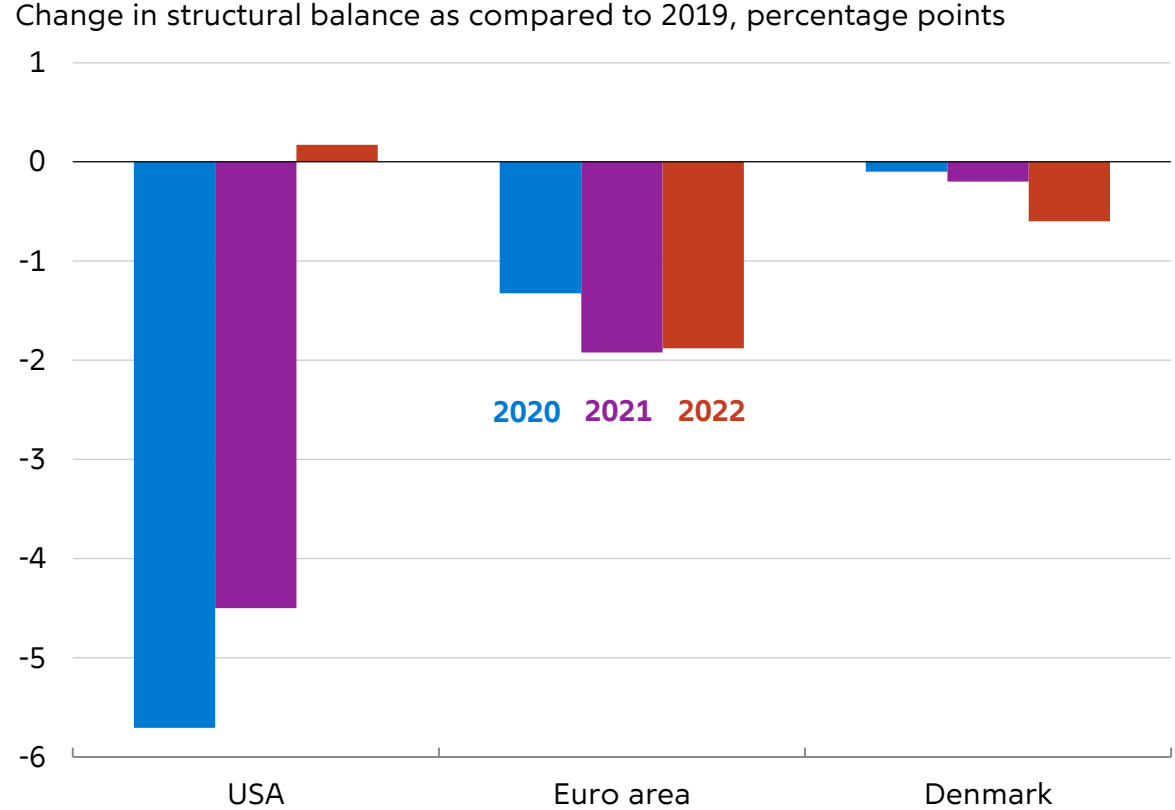
# Why – 2) .... And due to monetary and fiscal stimuli particularly in the US (Wicksellian theories and fiscal inflation)

## Large drop in the policy rates in the US at the start of the pandemic



Source: Macrobond.

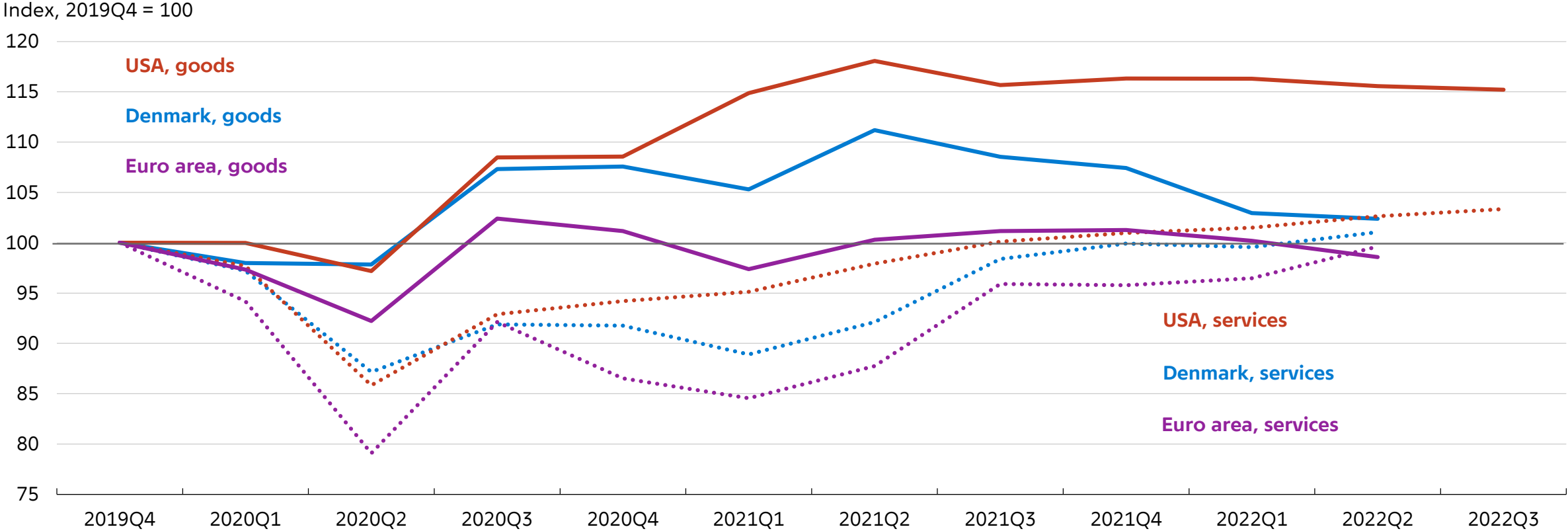
## Very expansionary fiscal policy, particularly in the US



Note: A negative value indicates that fiscal policy is accommodative compared to 2019. Structural balance based on OECD June Economic outlook for the US and euro area. Structural balance for Denmark is based on the Danish Ministry of Finance's "Økonomisk redegørelse" from August 2022. Source: OECD, Danish Ministry of Finance and own calculations.

# Why 2) continued – which have supported strong goods consumption in the US and Denmark (demand-pull inflation)

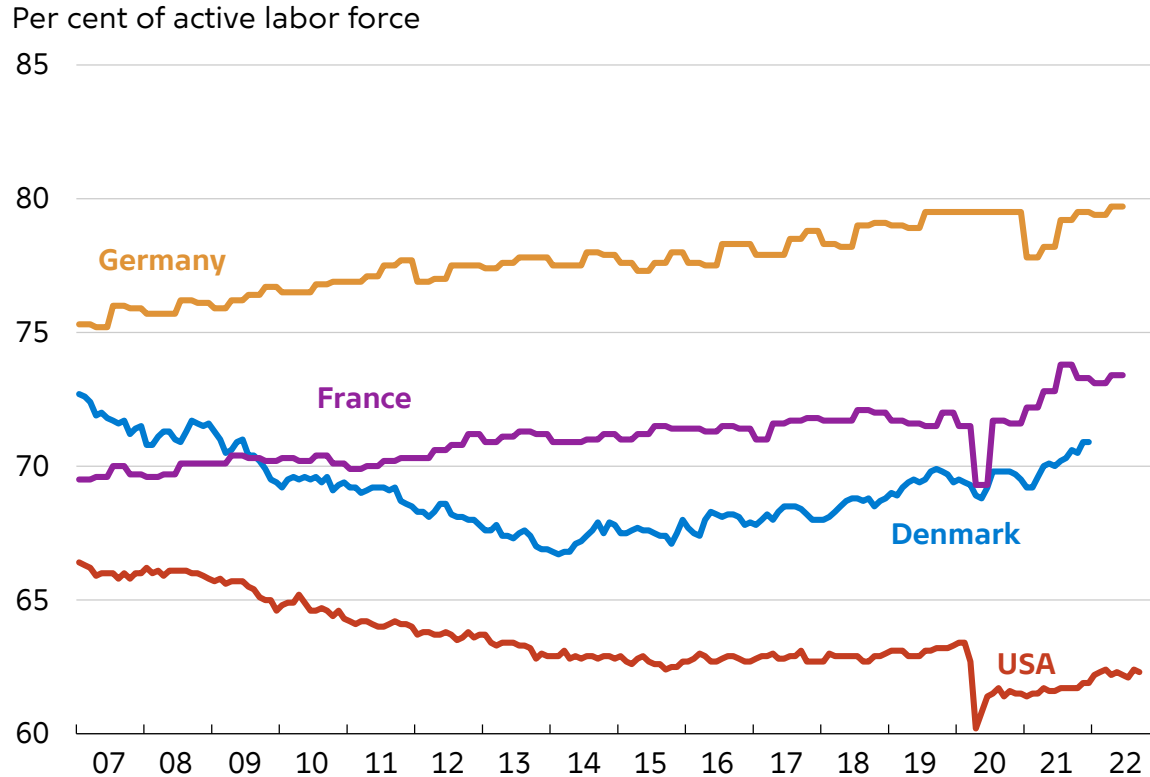
## Strong demand for goods after the initial shock



Note: Real consumption. Euro area is a weighted average of Germany, France, Italy and the Netherlands, where weights are the share of total GDP of the respective country. Source: Macrobond and own calculations.

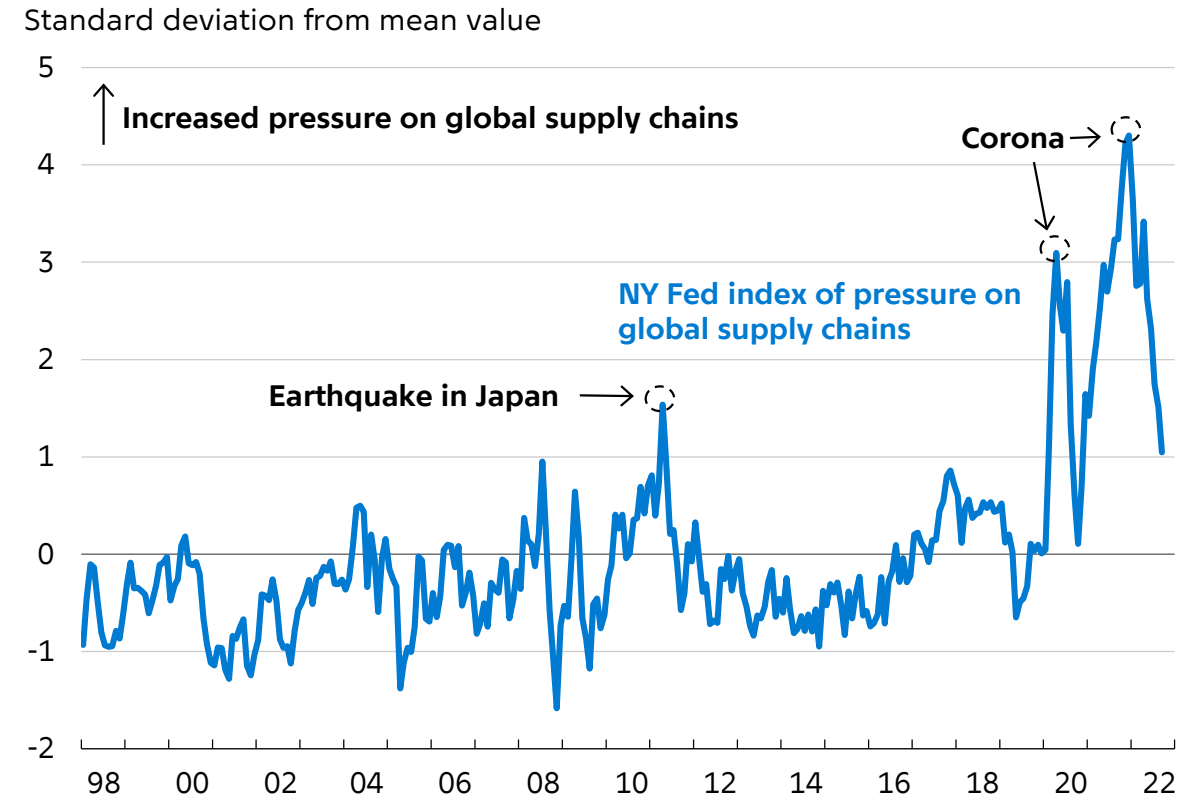
# Why 3) – Supply disruptions in the US labour market and in goods markets (global economy at steeper end of aggregate supply curve)

The participation rate is still below pre-pandemic levels in the US, but higher in European countries...



Source: Macrobond.

... while supply chain disruptions were particularly an issue during 2020 and 2021

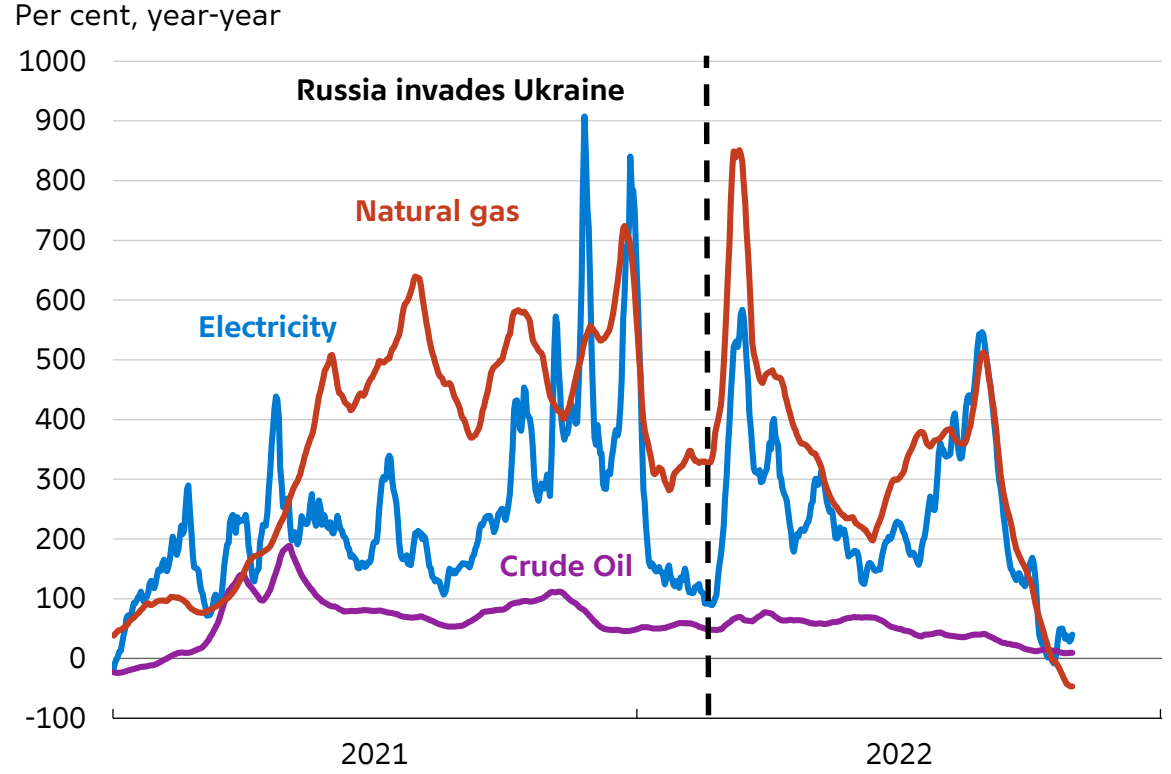


Note: The index is normalized such that a value near zero indicates that the index is at its mean value, where positive values represent how many standard deviations the index is above its mean value (and negative values represent the contrary).

Source: Macrobond.

# Why - 4) Energy and food prices have risen sharply through 2021 and 2022 (cost-push inflation)

## European energy prices have risen very sharply during 2021 and 2022



Note: The price of electricity refers to the average price on Nordpool, the price of gas is based on TFF-Natural gas and the price of oil is USD per Barrel, calculated as a 14-days moving average. Source: Macrobond and own calculations.

## The price increases of food are very high



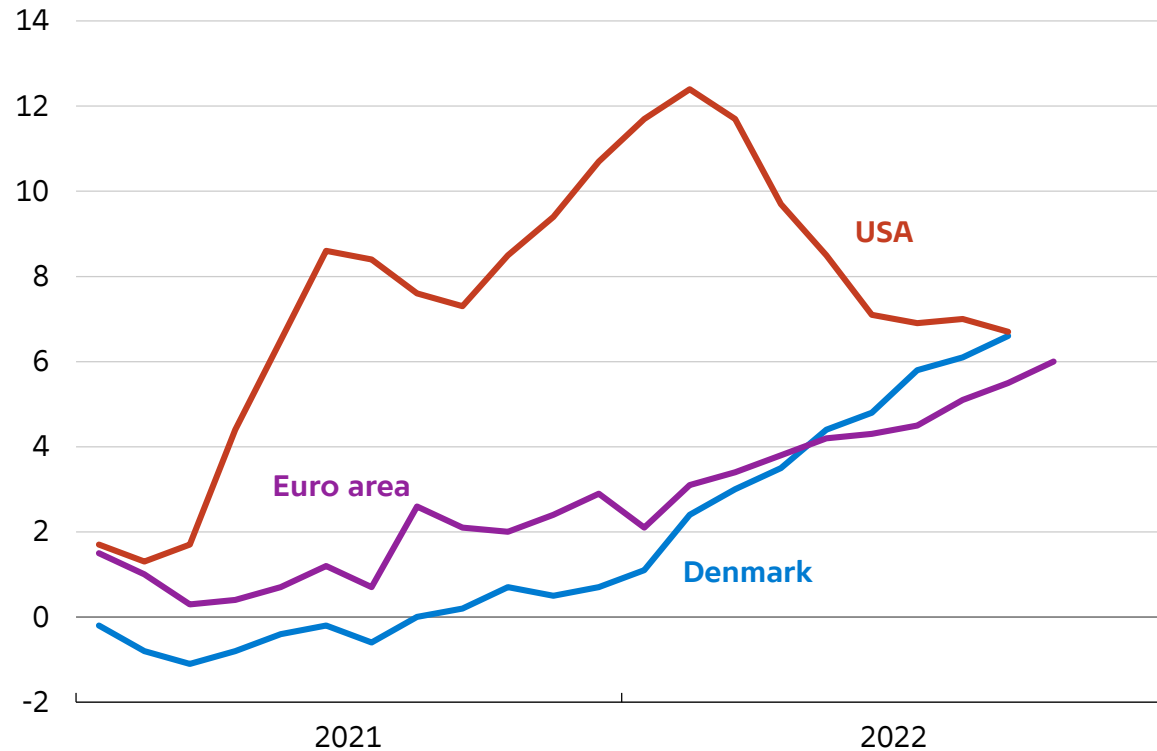
Note: Food index from Hamburg Institute of International Economics (HWWI). Source: Macrobond.



# Supply- and demand shocks across countries and sectors help explain the aggregate high inflation

## Inflation in durable goods consumption is now similar across the three economies

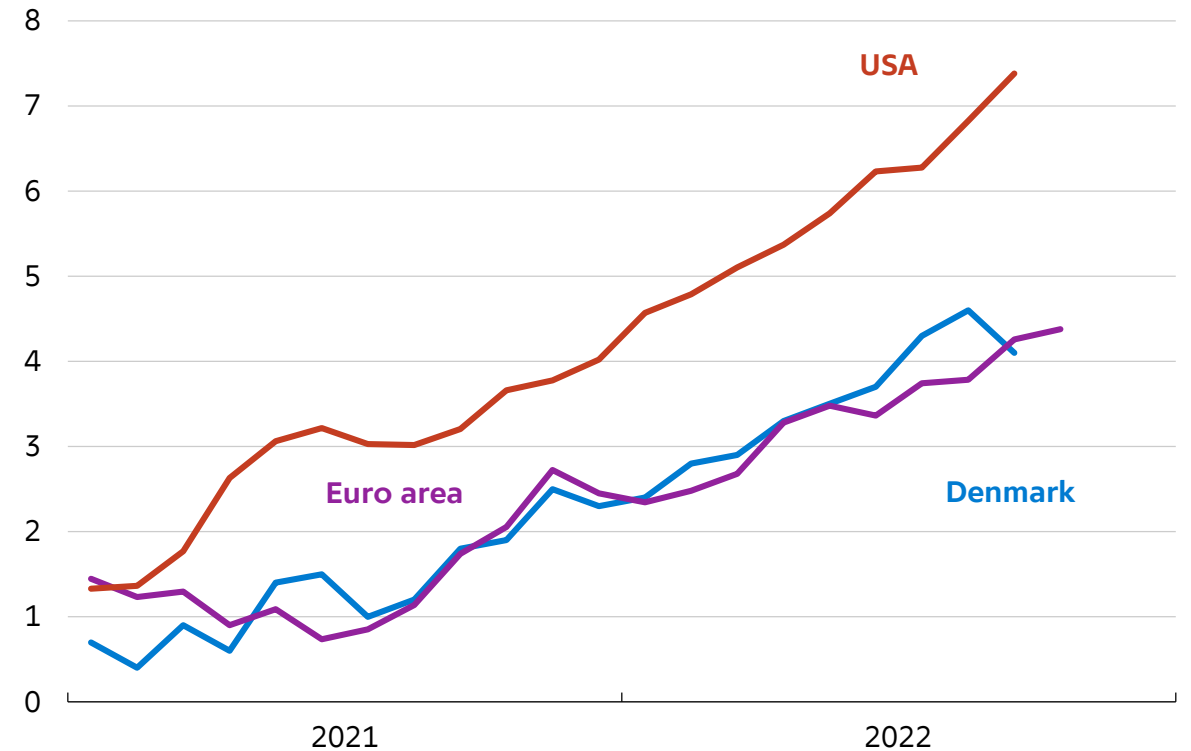
Per cent, year-year



Source: Macrobond.

## Inflation in services is increasing in all three economies

Per cent, year-year

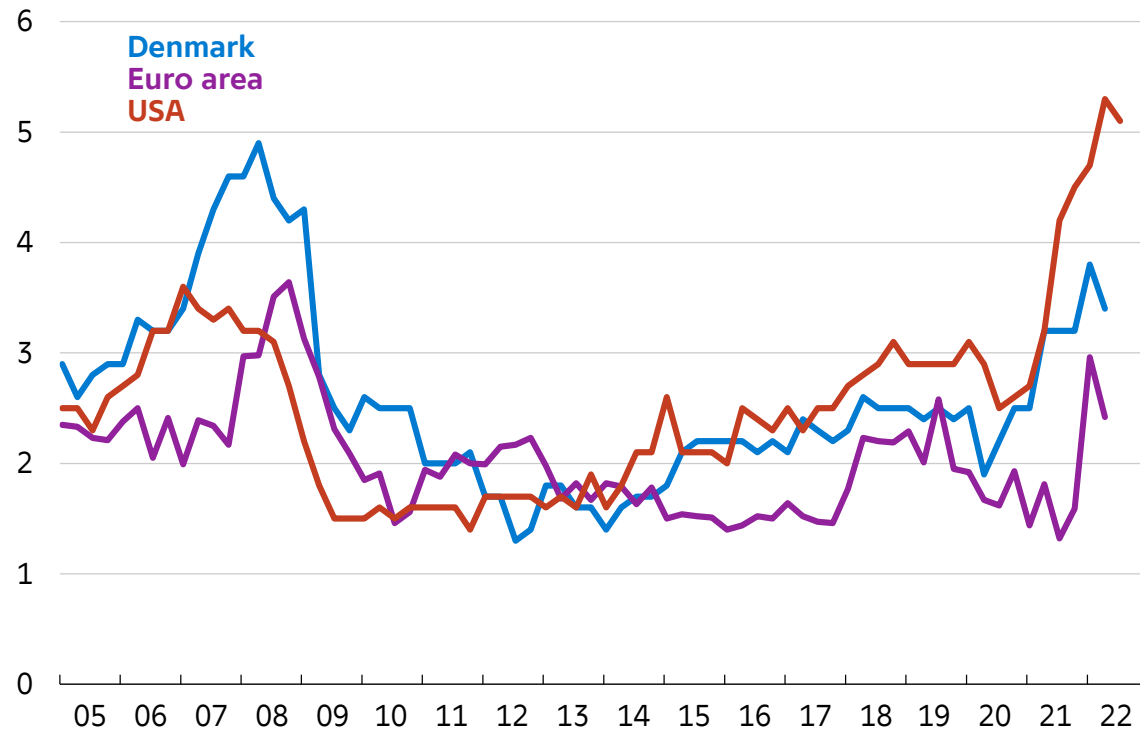


Source: Macrobond.

# High US wage growth underlines service price inflation; EUR and DKK depreciation supports imported inflation

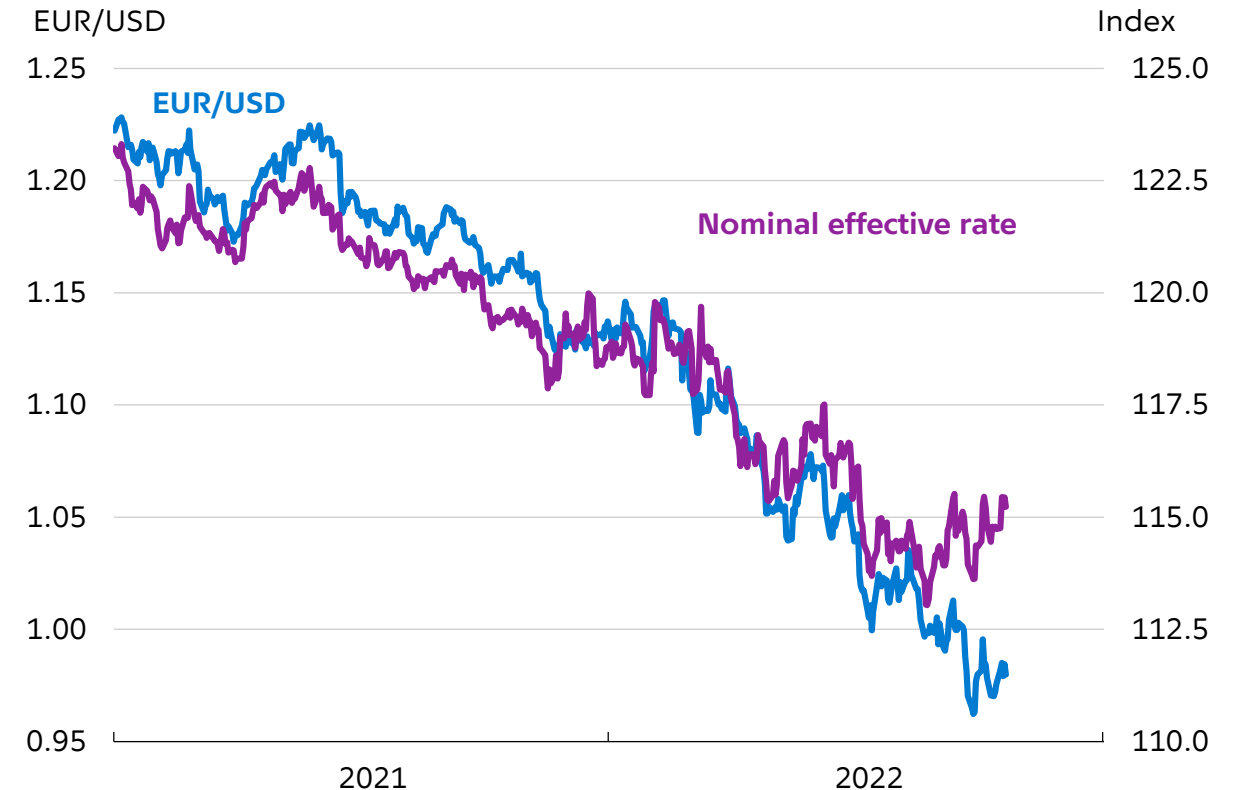
## Wage growth is still significantly higher in the US than in the Euro area and Denmark

Per cent, year-on-year



Note: Data from Dansk Arbejdsgiverforening is used for Denmark, ECB's negotiated wage indicator is used for the Euro area, and the employment cost index is used for the US.  
Source: Macrobond.

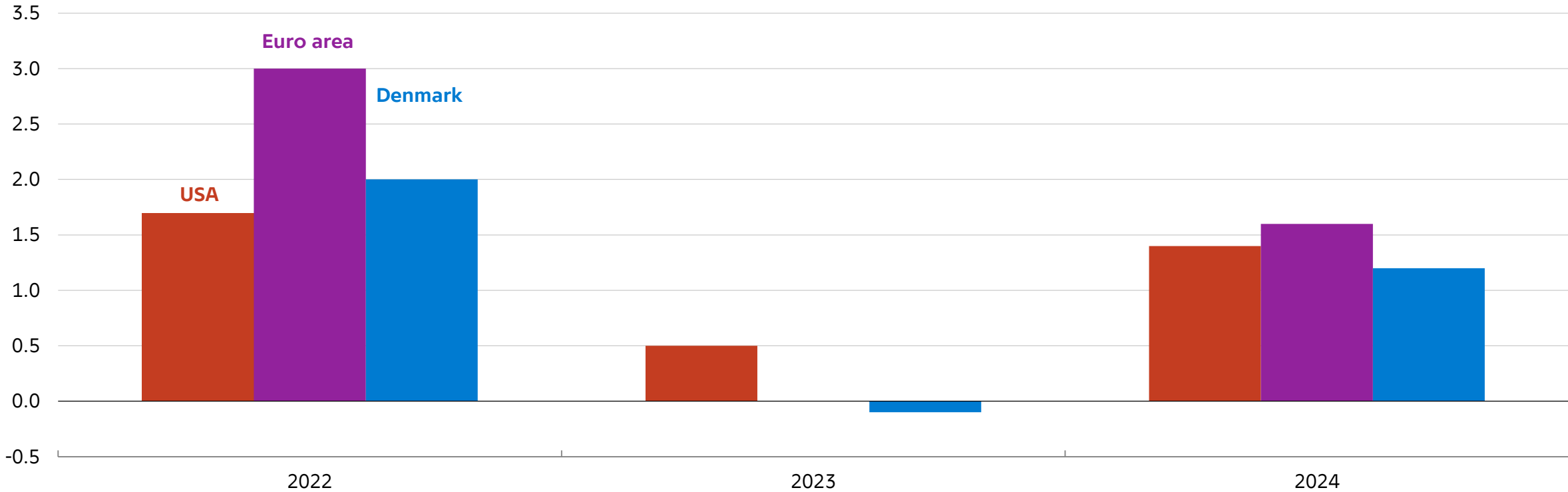
## The euro has weakened sharply against USD and in trade-weighted terms



Source: Macrobond.

# Where are we heading – 1) Lower growth will weaken disposable incomes and employment weighing on demand (Phillips curve and demand-pull inflation)

Per cent, year-on-year

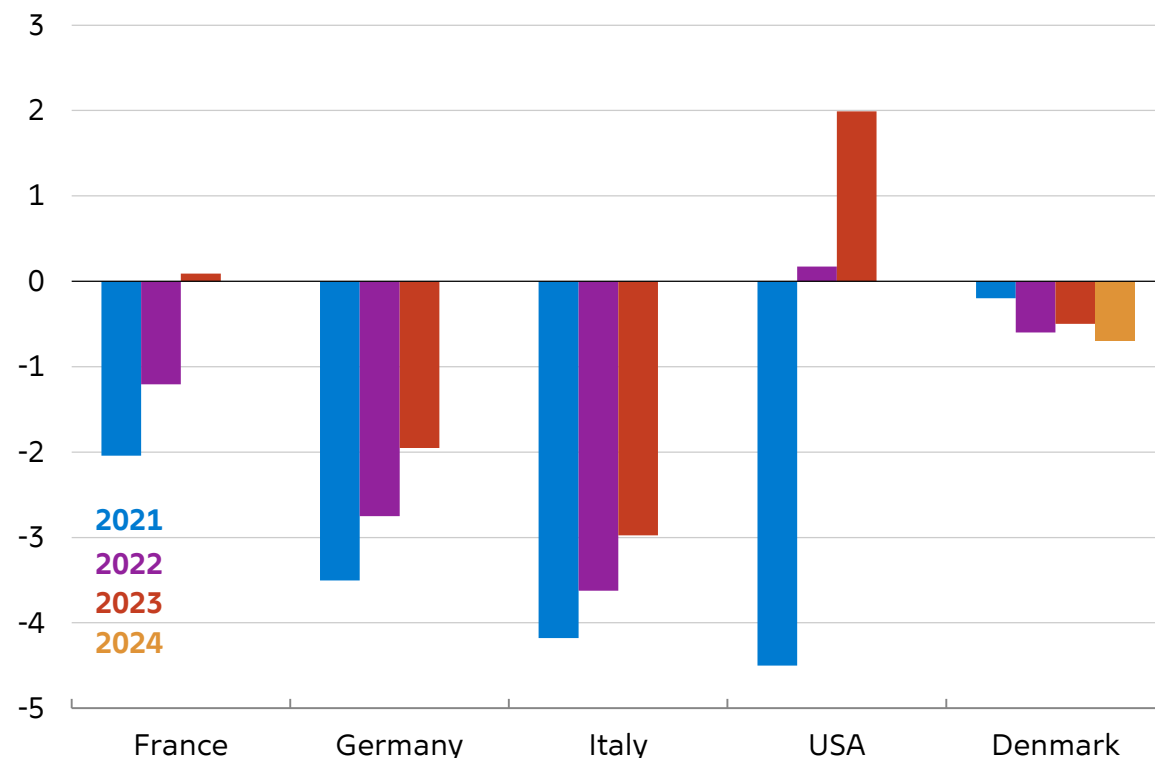


Note: The growth rate for the US and euro area is based on Bloomberg consensus. The forecast for Denmark is based on Danmarks Nationalbank's own forecast. Source: Bloomberg and Denmark's Nationalbank.

# Where are we heading – 2) Fiscal policy is set to tighten in the US and Denmark but is still expansionary in the euro area (fiscal inflation)

## Fiscal policy in the euro area is still expansionary...

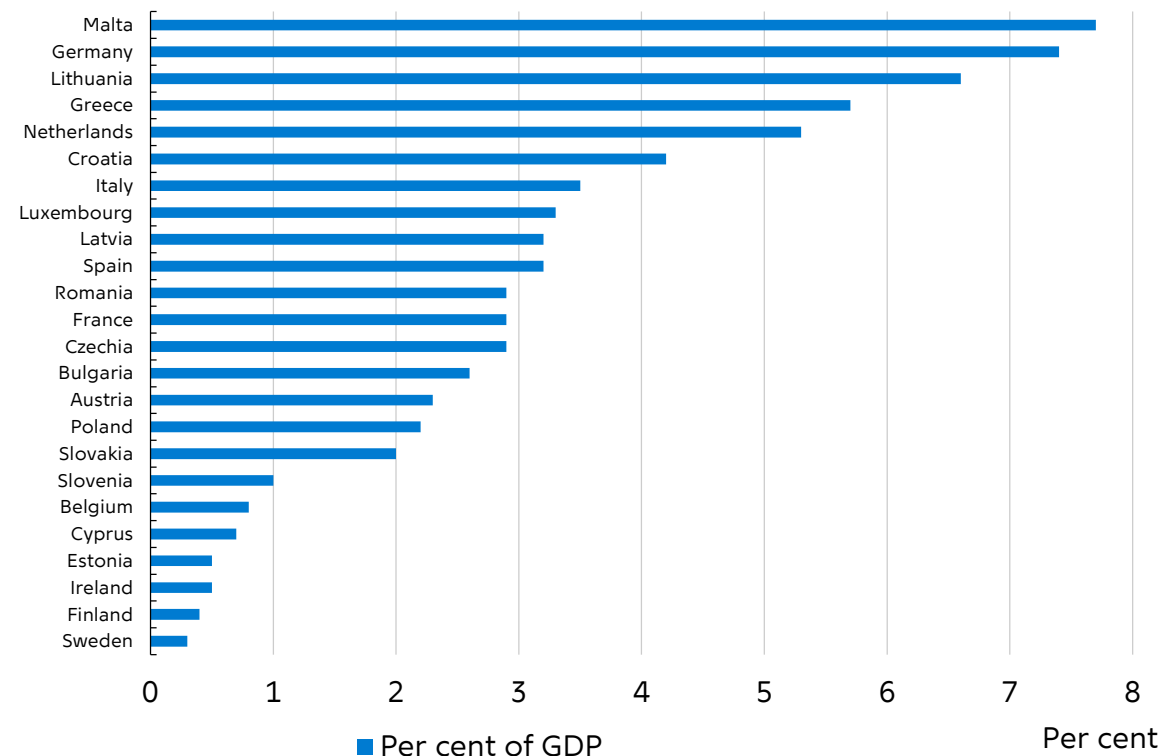
Change in structural balance as compared to 2019, percentage points



Note: Data of the structural balance for France, Germany and Italy is from the European Commission. Data for the US is from OECD, and data for Denmark is from the Danish Ministry of Finance's "Økonomisk Redegørelse", August 2022.

Source: Macrobond, European Commission, OECD and Danish Ministry of Finance.

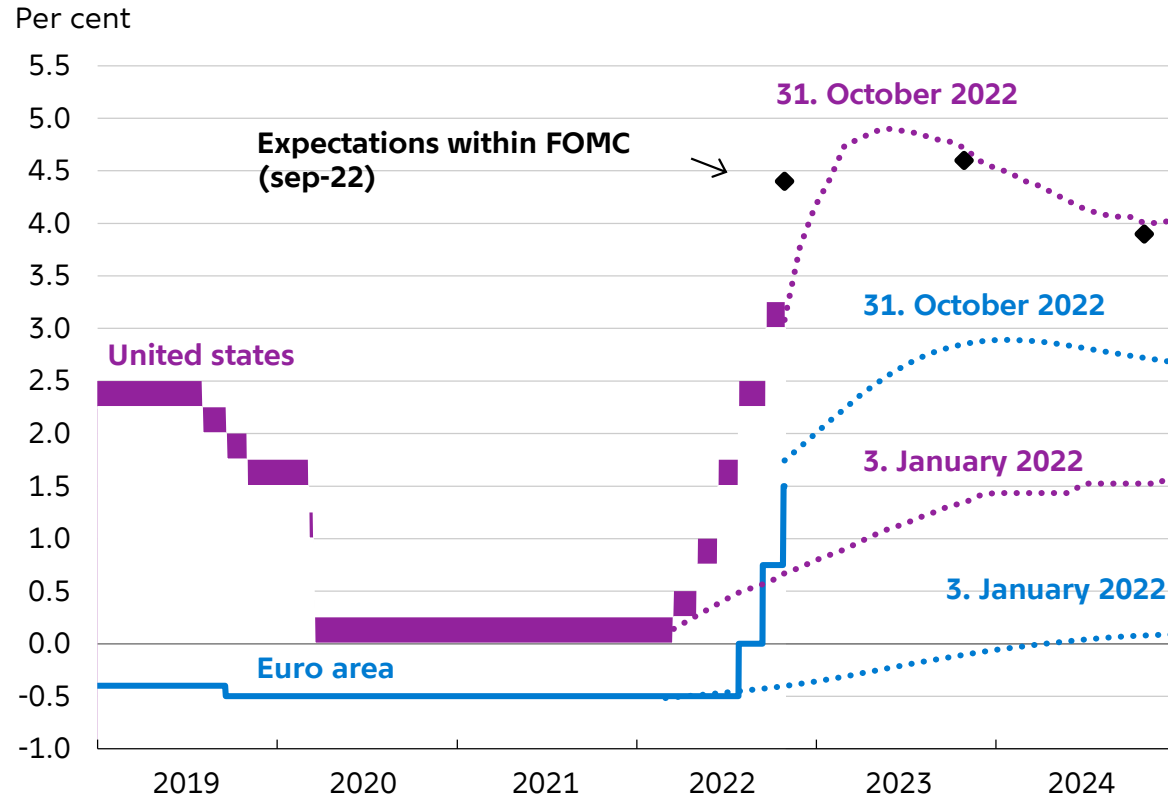
## ... which amongst others is due to the funding allocated to shield households and firms from the rising energy prices



Note: Data covers the period until 20 October 2022. Source: Bruegel.

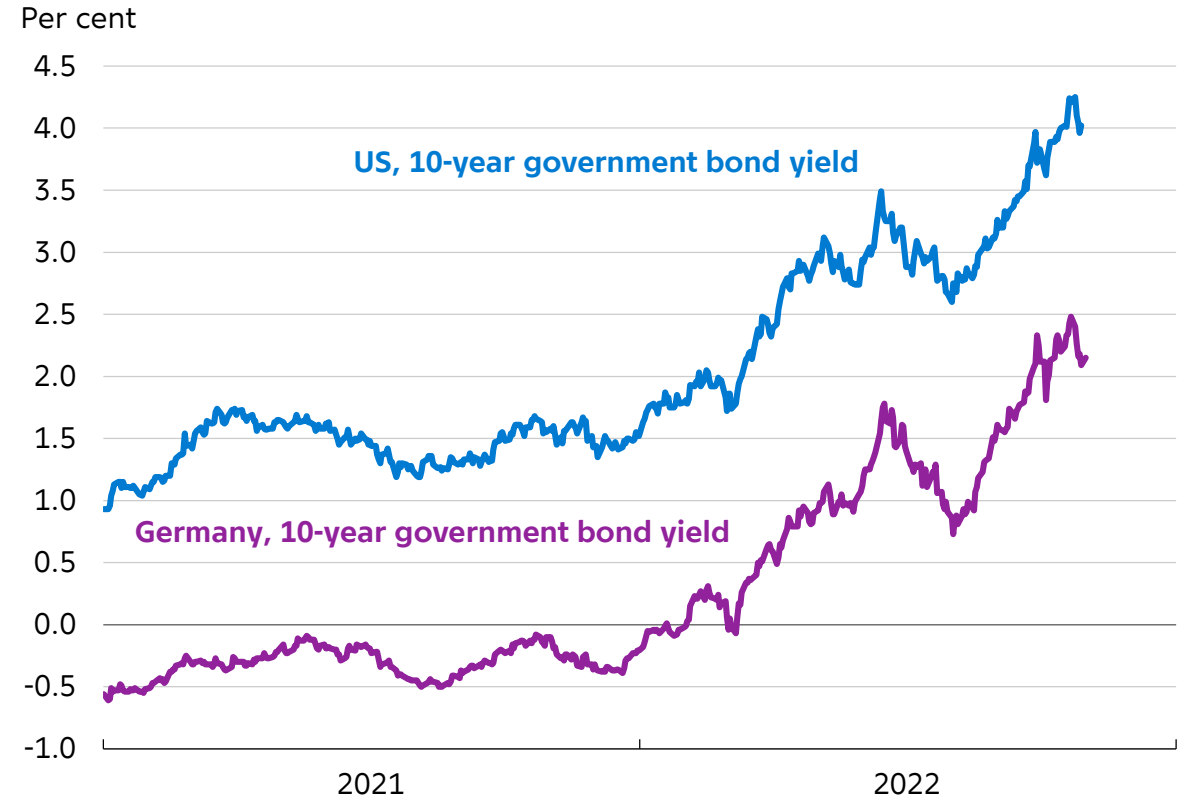
# Where are we heading – 3) Fed and ECB have used multiple tools to tighten monetary policy over the last year (Wicksellian theories and monetary policy shocks)

Significant rate hikes from the Federal Reserve and ECB since March and the market expects further hikes in the near future



Source: Macrobond and Scanrate Rio.

Fed and ECB influenced the markets prior to the rate hikes

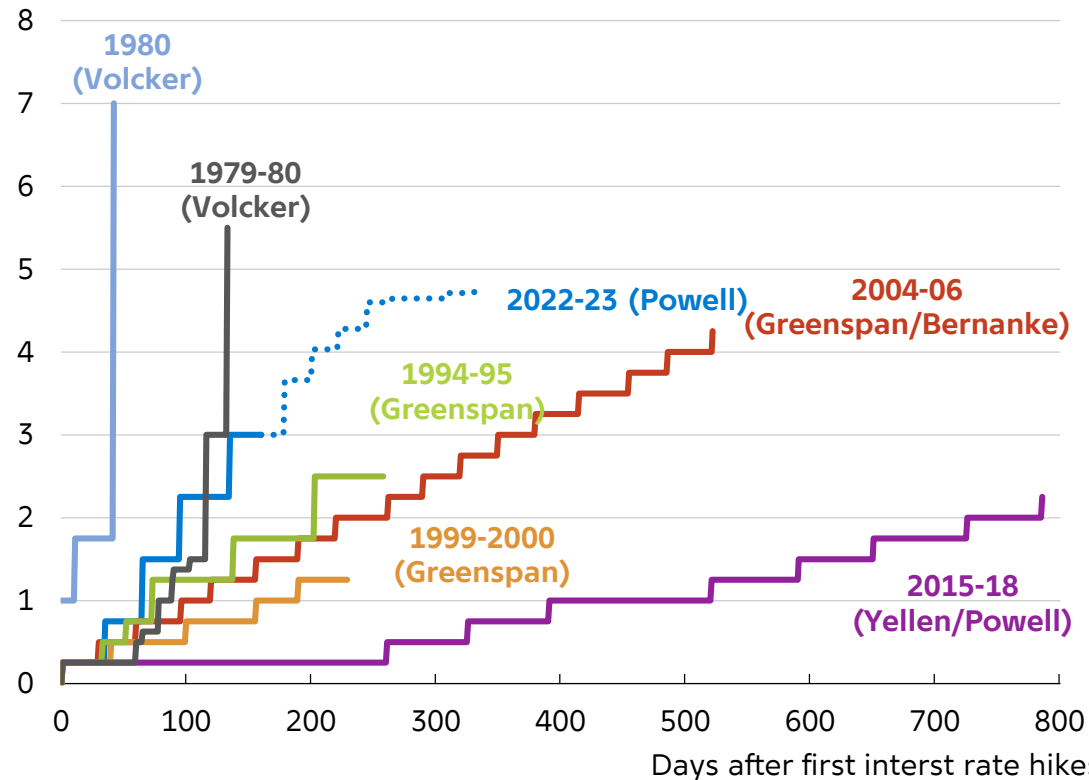


Source: Macrobond.

# Where are we heading – 3 cont) Large rate hikes from Fed and ECB, also from a historical perspective (Wicksellian theories and monetary policy shocks)

## The pace of Fed's rate hikes is the fastest since the 1970s

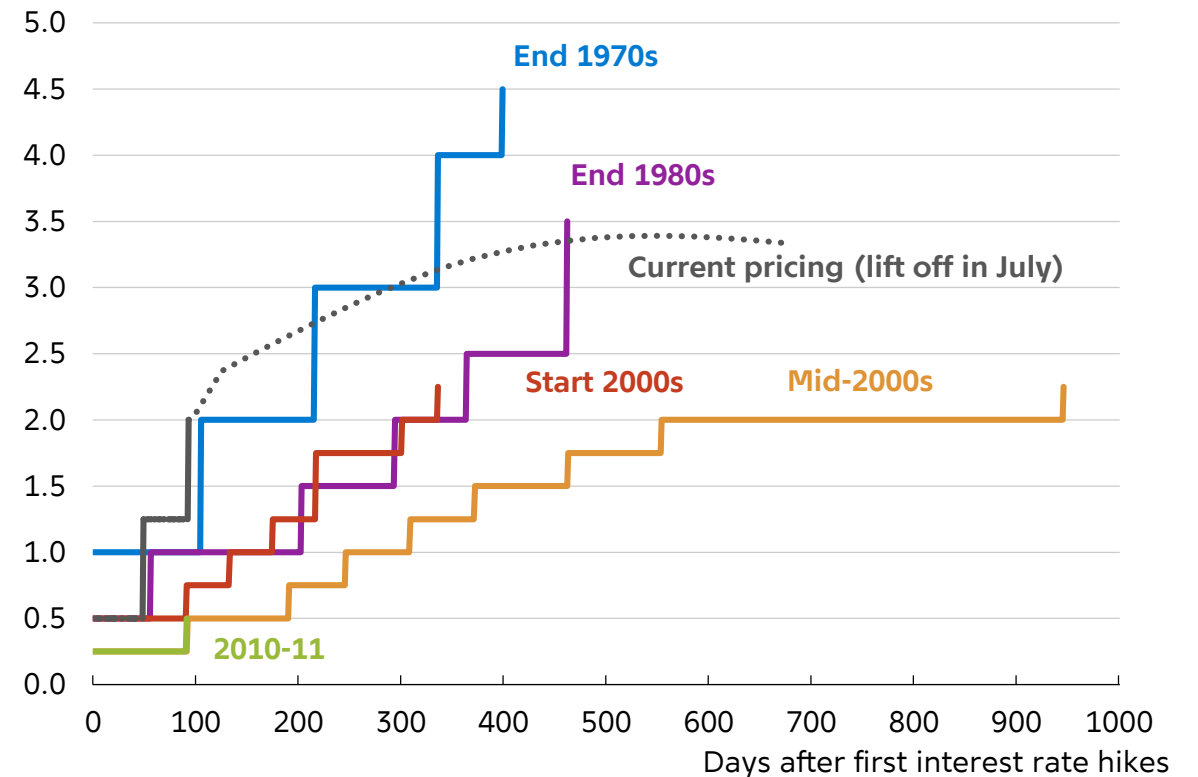
Changes in policy rates, percentage points



Note: Market expectations to Federal Funds rate per October 26th.  
Source: Macrobond and own calculations.

## ECB has not previously increased their rates this fast

Changes in policy rates, percentage points



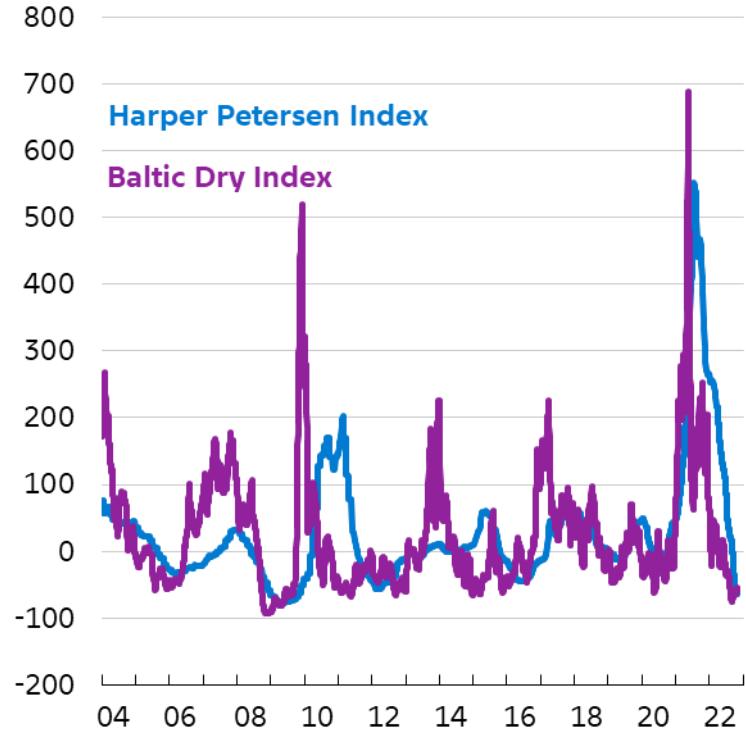
Note: Periods with rate hikes for respectively Bundesbank and ECB (Bundesbank for the two earliest periods). Dotted black curve represents the implicit market expectations to ECB's future deposit facility rate per October 26th 2022 based on the Euro-OIS-forward curve. The period in the end 1970s reflects the first period of rate hikes.

Source: Macrobond, Thomson Reuters, Scanrate Rio and Denmark's Nationalbank.

# Where are we heading 4) - Global supply chains are improving (global economy at less steep end of aggregate supply curve)

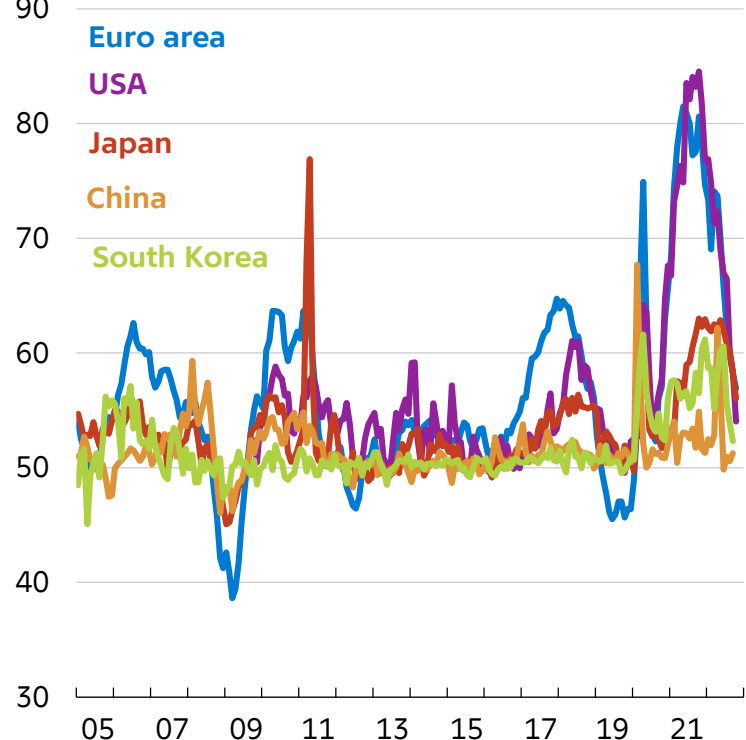
## Growth of container shipping rates has fallen recently

Per cent, year-year



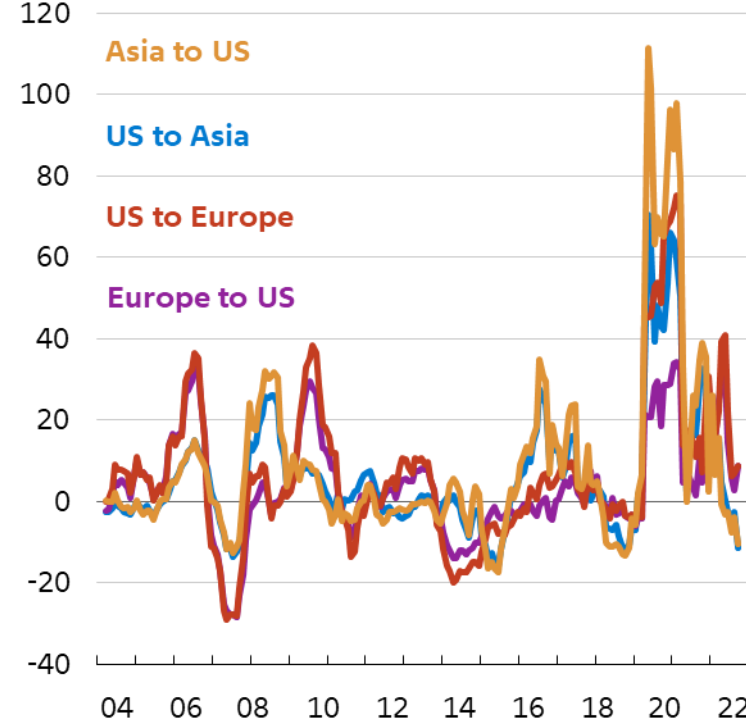
## Delivery times have improved

Delivery times, index



## Inflation in air freight prices have dropped recently

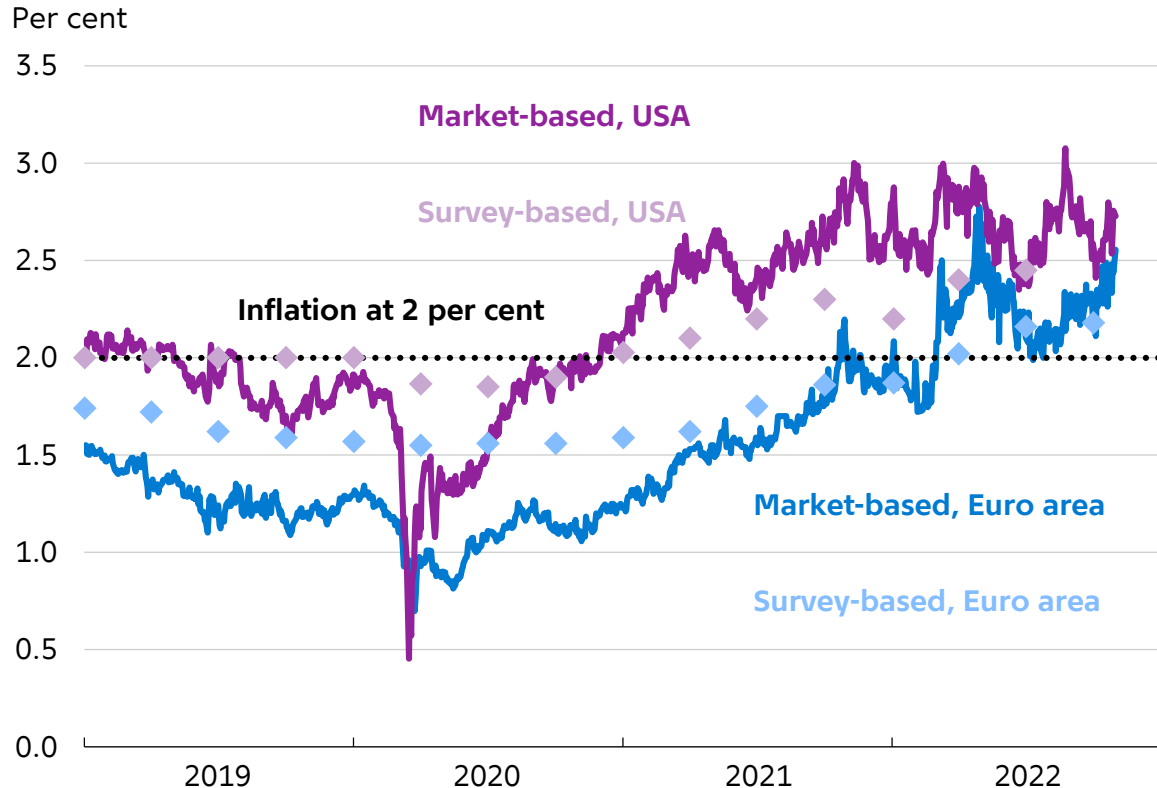
Per cent, year-year



Note: Note: Delivery times are constructed via PMI. Delivery times have been inverted such that readings above 50 indicate longer delivery times. Source: Macrobond.

# Where are we heading 4) - Most evidence points to well-anchored long-term inflation expectations (Phillips curve)

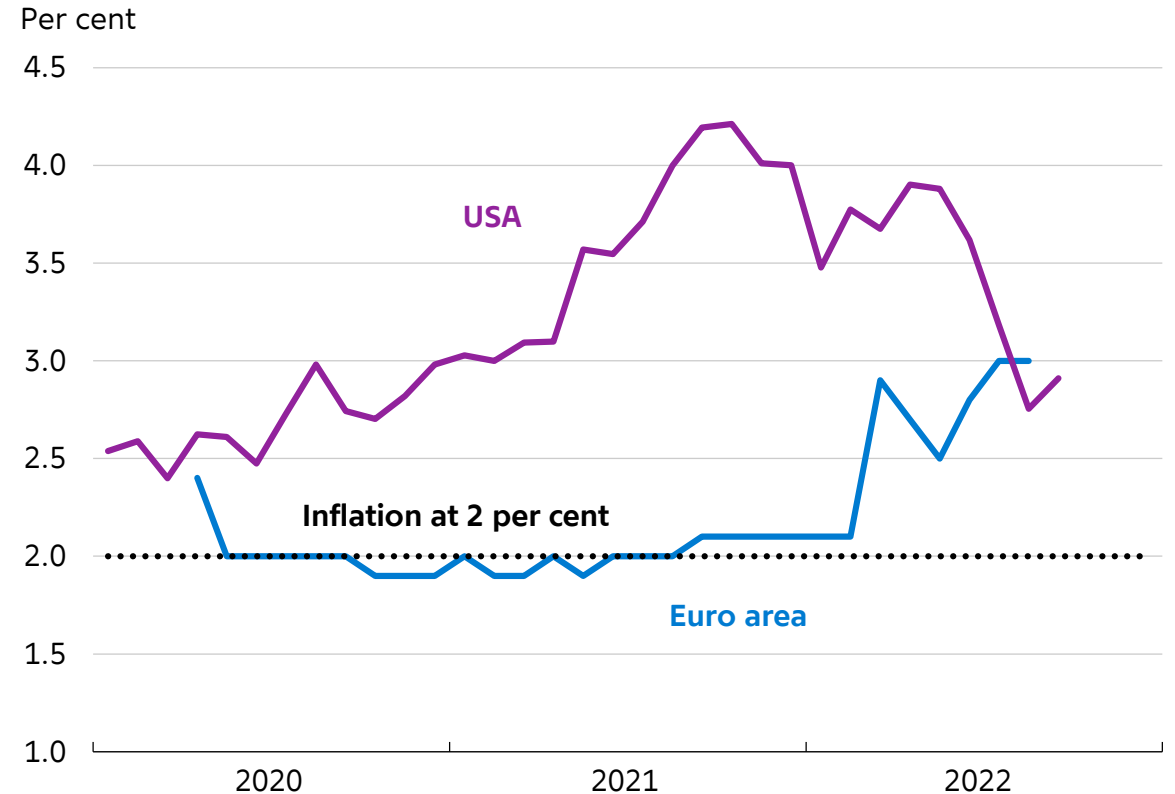
## The long-term inflation expectations are well-anchored



Note: The market-based inflation expectations are based on a 5y-5y inflation swap. The survey-based inflation expectations for the euro area reflect the expectations of inflation in 5 years in ECB's Survey of Professional Forecasters, while the survey-based inflation expectation of the US reflects the expectations of inflation in the next 5-10 year in Fed's Survey of Professional Forecasters.

Source: Refinitiv Eikon and Macrobond.

## Households expect a relatively high inflation in 3 years in the US and Euro area



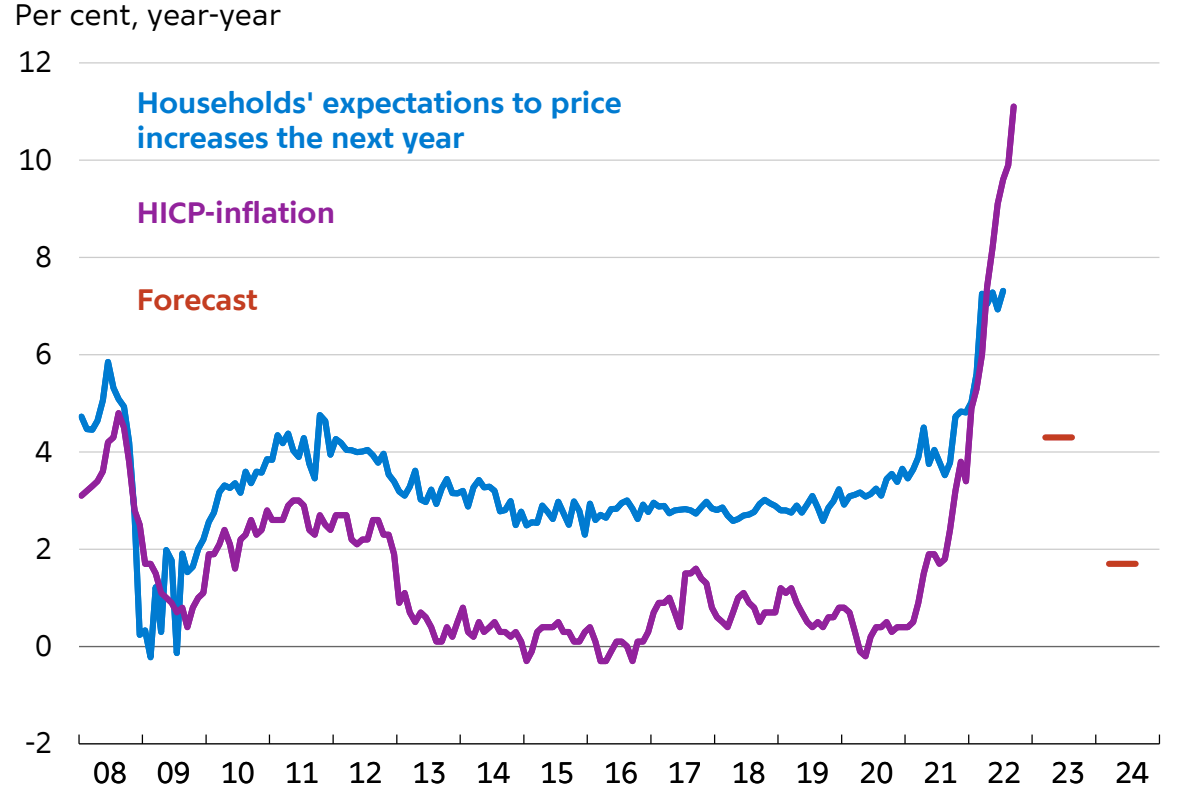
Note: The chart shows the median of the survey-based household expectations to inflation in 3 years.

Source: ECB, Federal Reserve Bank of New York and Macrobond.

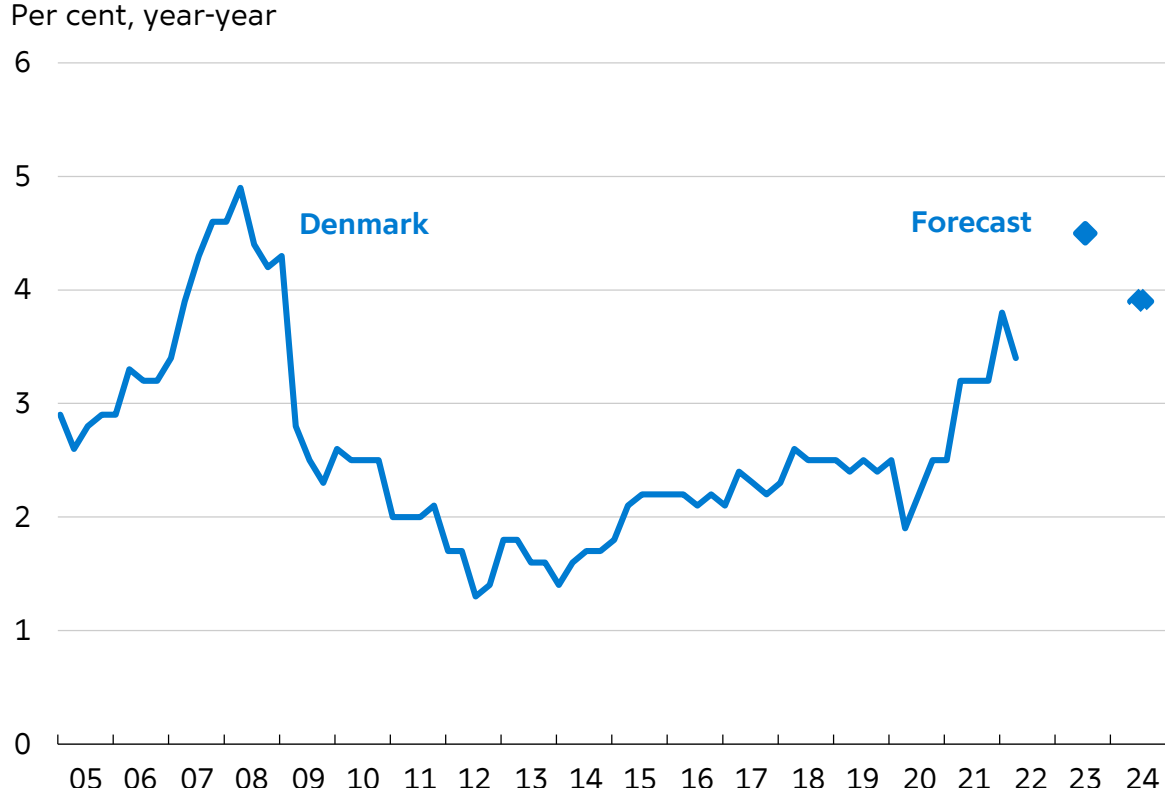


# A special focus on DK: There are risks of inflation becoming entrenched due to the tight labour market and very high inflation

Households in Denmark expect significant inflation next year, but the september prognosis expects a relatively quick reduction



Wage growth is expected to rise to just below 5% in 2023, almost on par with wage growth in 2007



Note: Household questionnaire-based inflation expectations for the next 12 months weighted by the difference between actual and perceived inflation, i.e. that households which neither overestimate nor underestimate the actual price increases are given a higher weight. HICP inflation refers to the EU Harmonised Index of Consumer Prices.

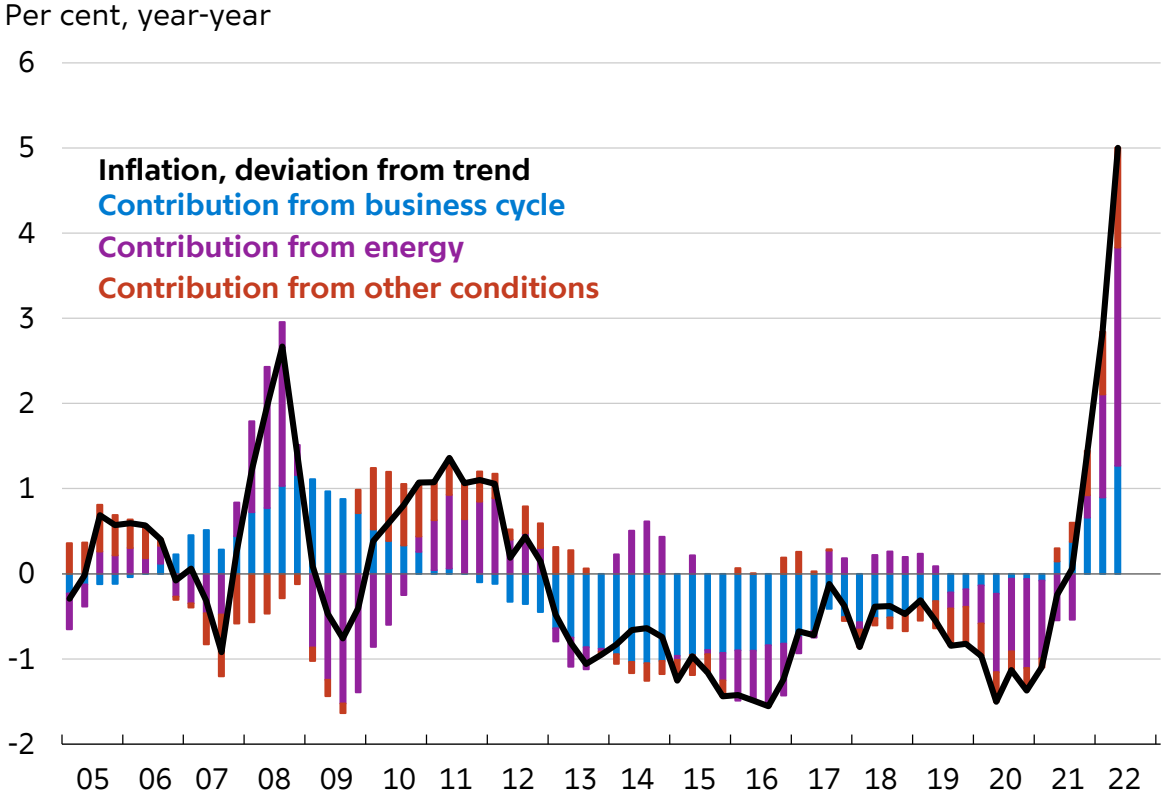
Note: The forecasts for 2023 and 2024 are from Danmarks Nationalbank, Outlook for the Danish economy. The Wage numbers are from The Confederation of Danish employers. Source: Macrobond.



Source: Statistics Denmark, Macrobond and own calculations

# A special focus on DK: Why is inflation high in Denmark? A trend-cycle model

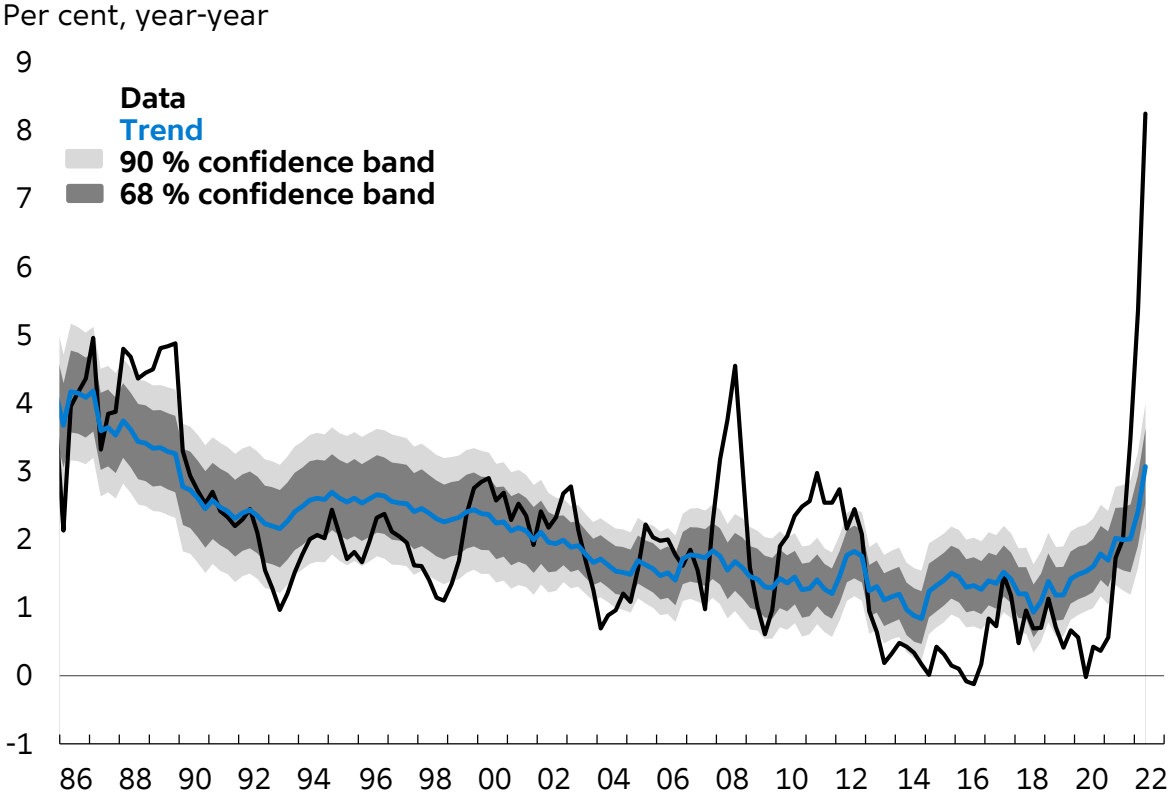
Energy is the primary driving force...



Note: The sum of the contributions in the chart corresponds to the deviation of inflation from a trend, meaning that it is not identical to actual inflation. The chart is based on a trend-cycle model in which HICP inflation is decomposed into contributions from a trend, energy prices and capacity pressures measured via a Philips curve for the output gap for the Danish economy.

Source: Statistics Denmark and own calculations.

... but the trend has increased

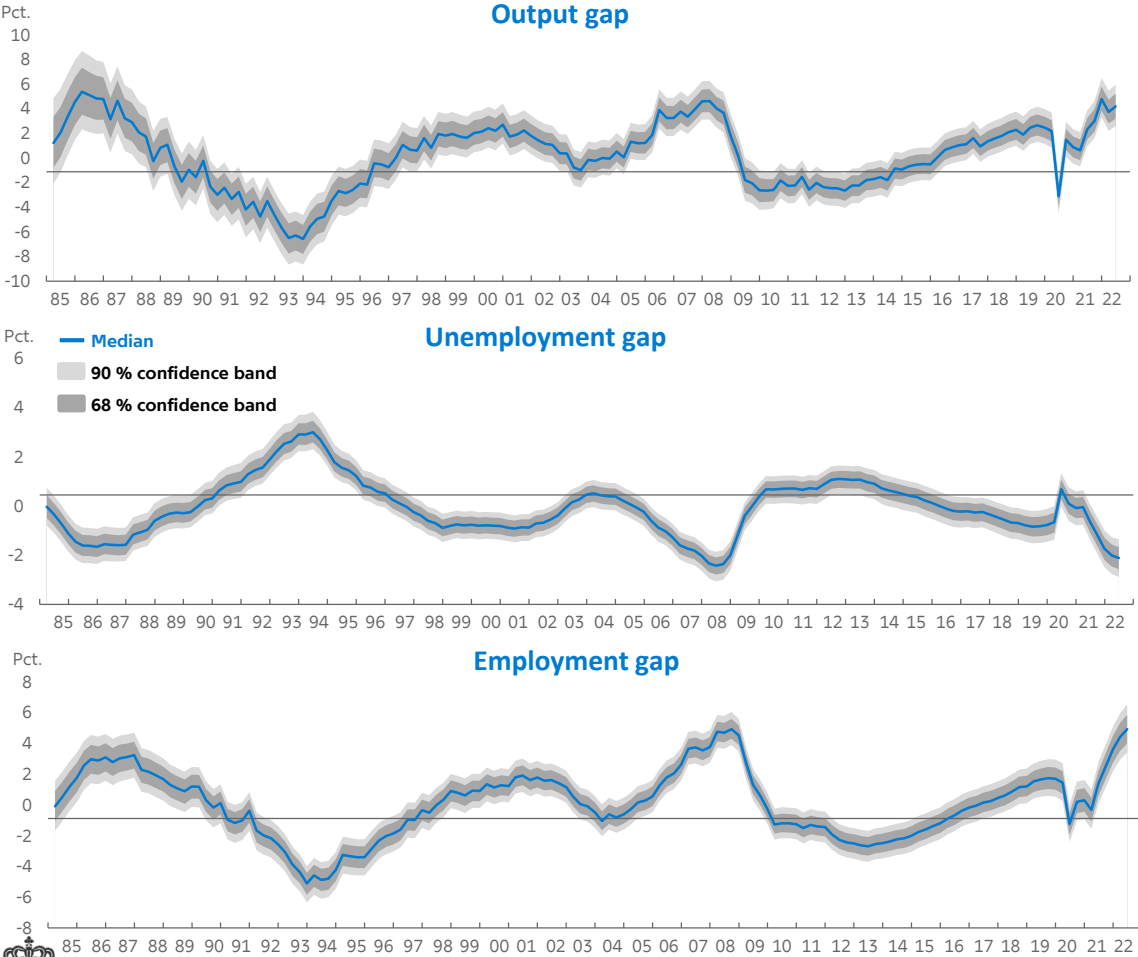


Source: Statistics Denmark and own calculations

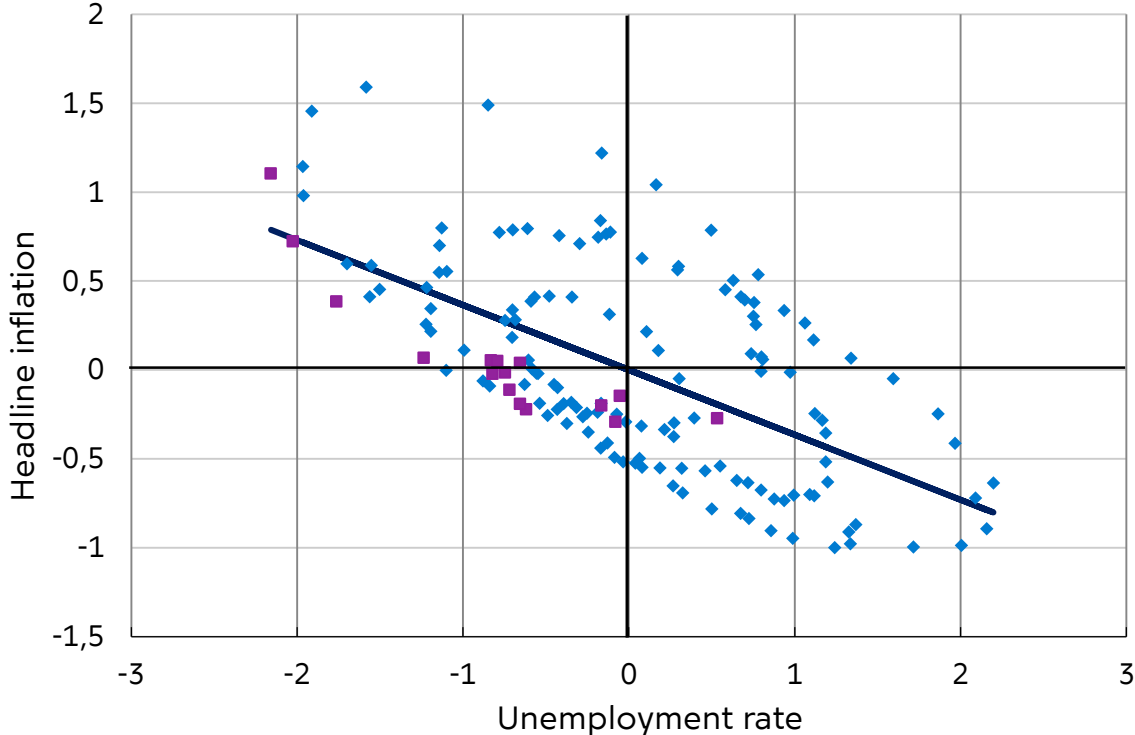


# A special focus on DK: Why is inflation high in Denmark? A trend-cycle model

Cyclical conditions are also pushing...



... via an active Philips curve



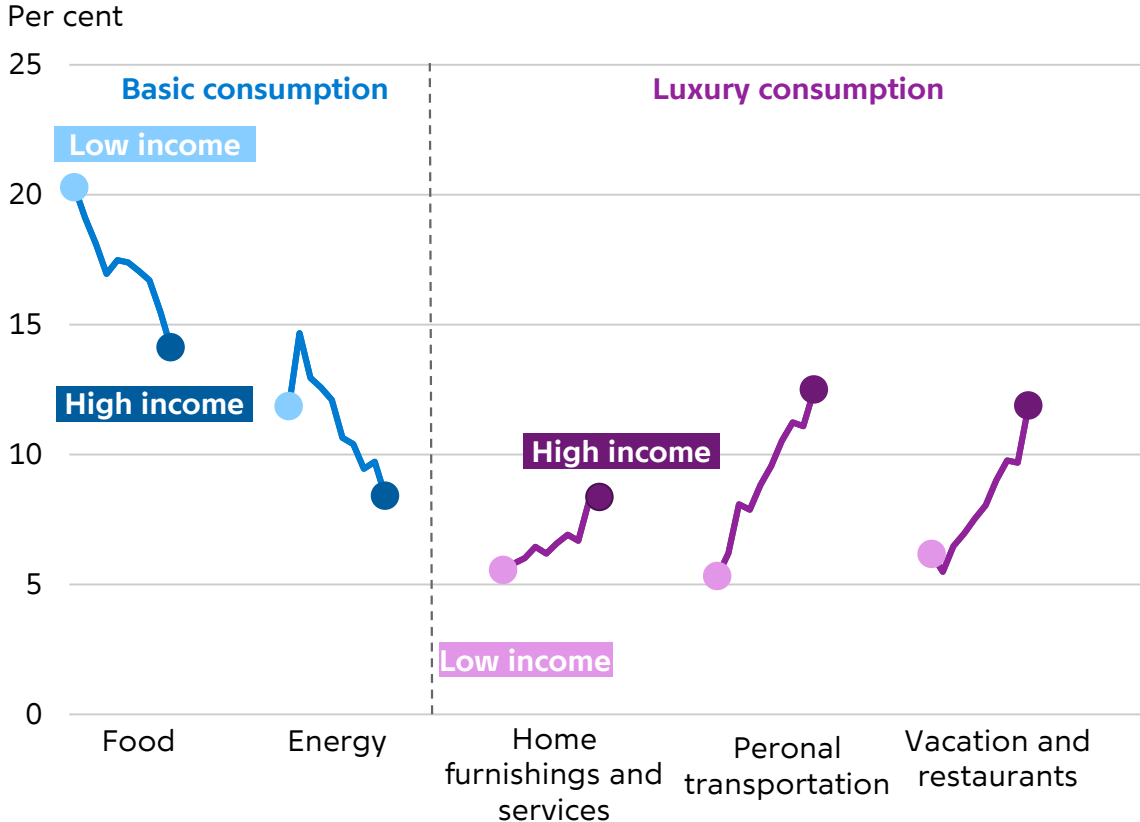
Philips relation  
Last 4 years

Estimated Philips curve  
Slope: -0,36

Note: The presented cyclical gaps are based on a trend-cycle model of the Danish inflation and may deviate somewhat from the cyclical gap presented in the latest outlook for the Danish economy. Source: Statistics Denmark and own calculations

# A special focus on Denmark: Inflation is currently higher for low-income households

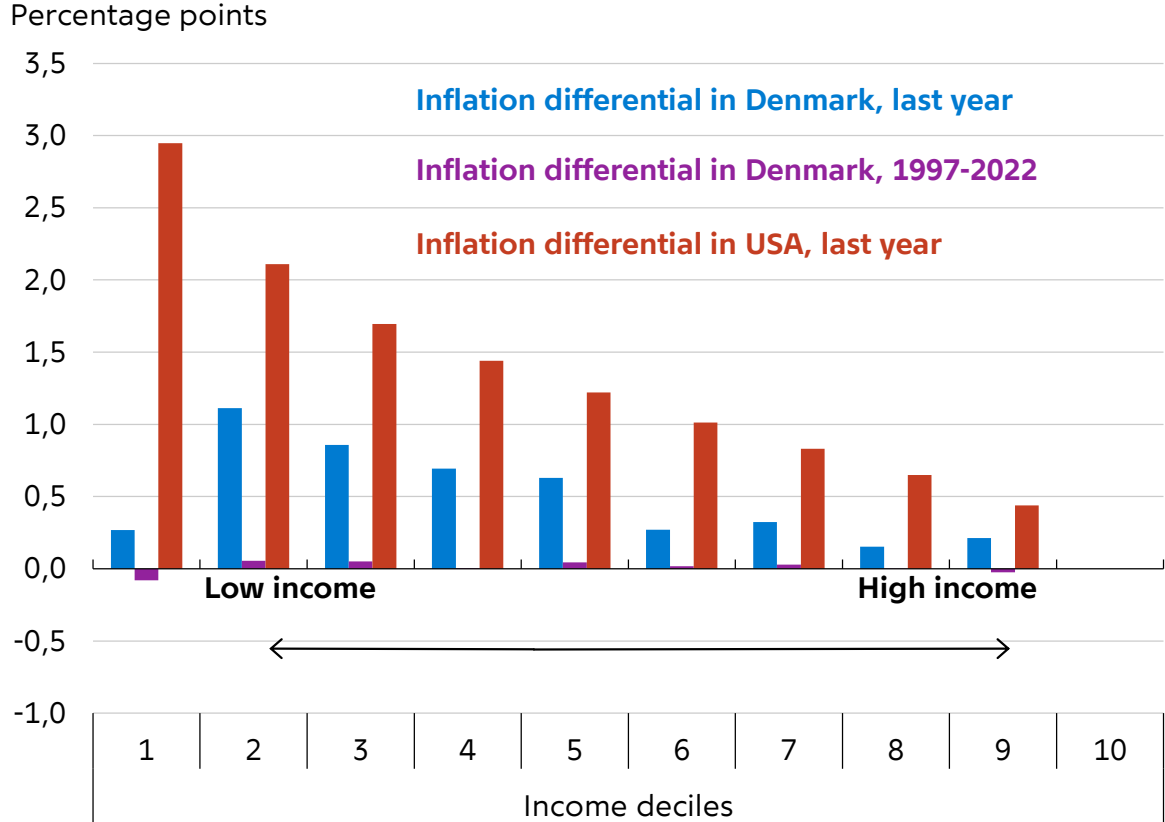
## Differences in households' consumption baskets....



Source: Statistics Denmark, own calculations and Weissert (2022), *Essays in Macroeconomics: Inflation inequality, consumption baskets and impulse responses*, PhD thesis, University of Copenhagen.



## ... give rise to inflation differentials

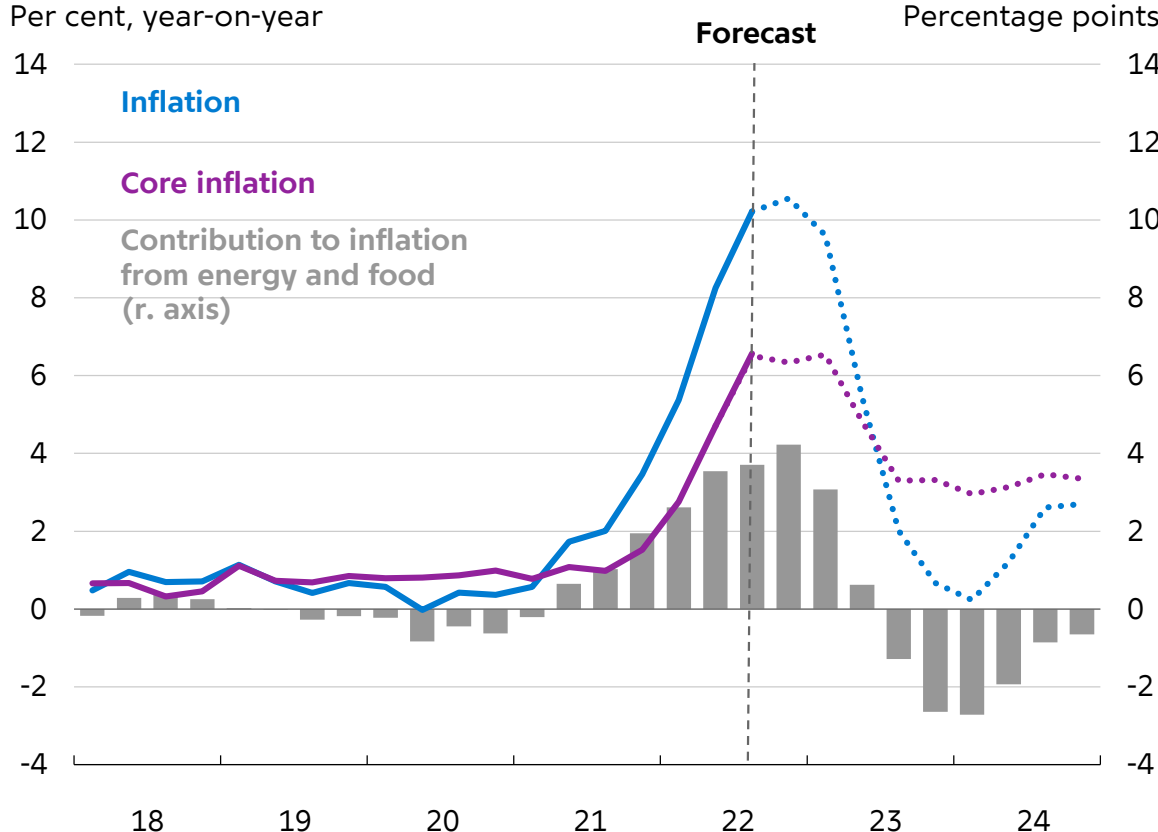


Note: For each income group, the chart is based on a Laspeyres price index calculated on the basis of the consumption in the period 2010-15 on the basis of microdata from Statistics Denmark's consumer survey. The inflation differential is calculated relative to the 10 per cent with the highest income.

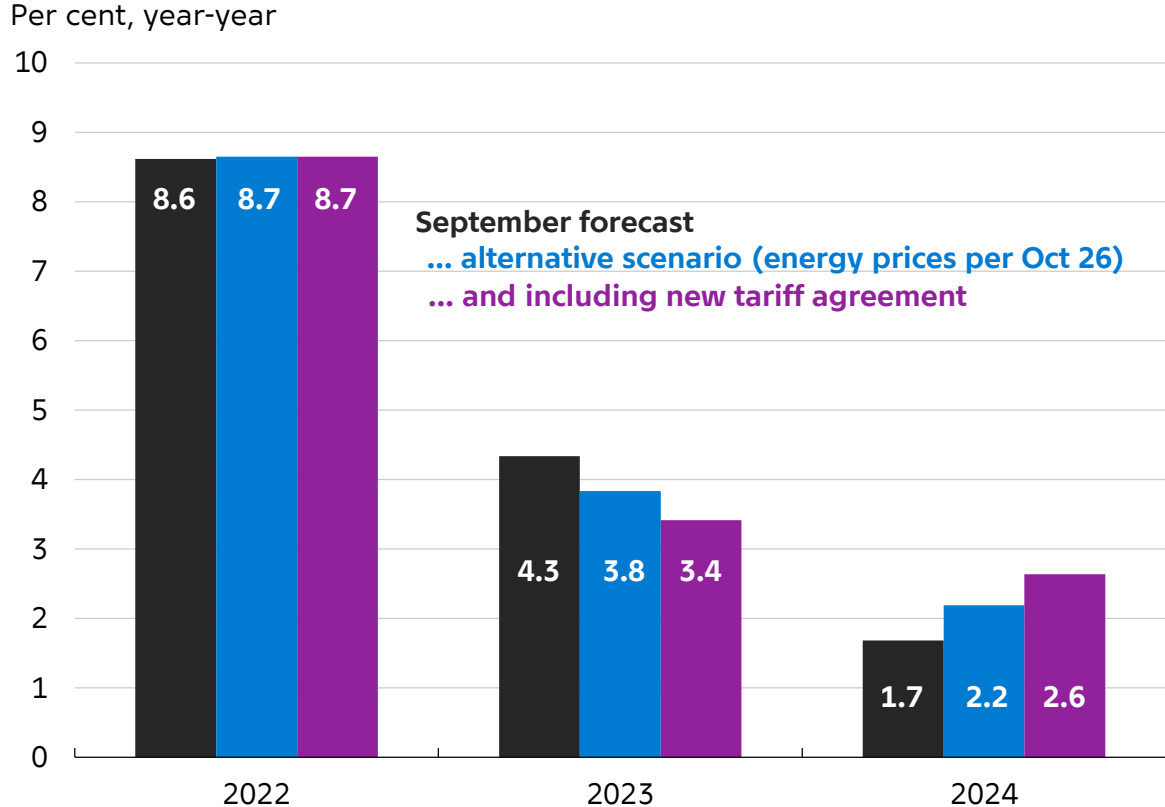
Source: Statistics Denmark, own calculations and Weissert (2022), *Essays in Macroeconomics: Inflation inequality, consumption baskets and impulse responses*, PhD thesis, University of Copenhagen.

# A special focus on Denmark: Inflation will remain high in 2023, but will still be significantly less than this year

We expect inflation will remain very high during the winter, but fall during 2023



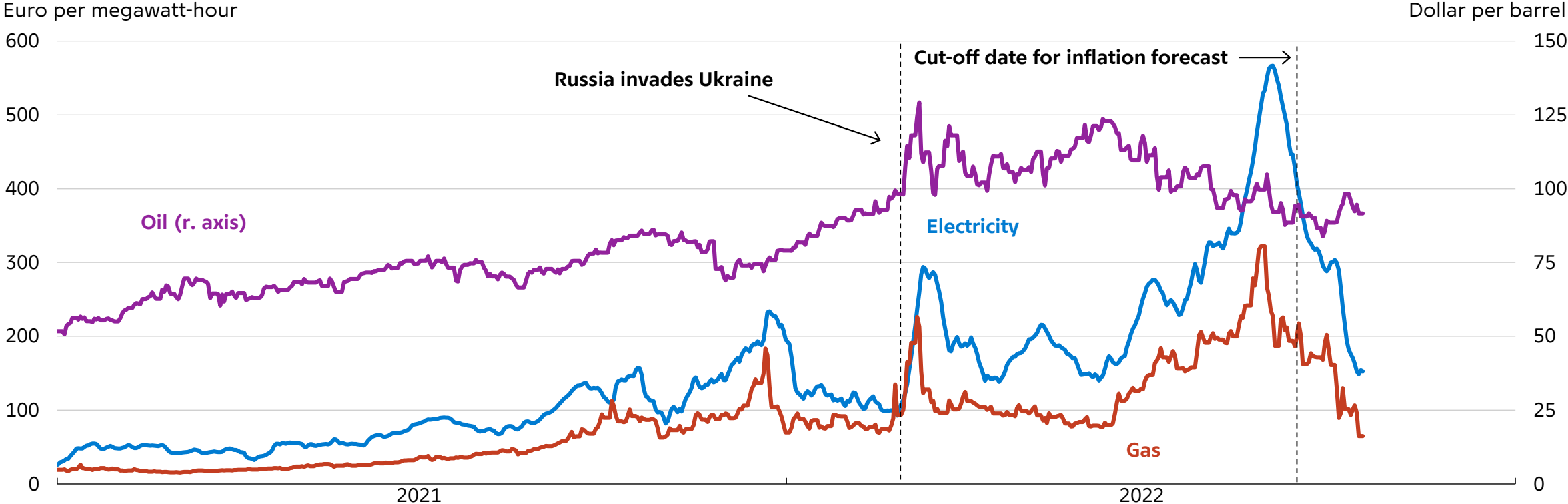
Sensitivity analysis shows that deviations in energy prices and new tariff agreement will have a significant effect on inflation



Source: Denmark's Nationalbank.

# The uncertainty is very high partly due to volatile energy prices

Gas and energy prices have fallen sharply since late August



Source: Macrobond and quarterly forecast of Nationalbanken from September.

# Implications for economic policy

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1) Government aid programmes which compensates specific groups due to high energy- and food prices should not increase economic activity and therefore capacity pressures in the economy

2) Subsidies and tax reductions implemented to reduce effects from high energy prices should be avoided, as they will support consumption of energy

3) Targeted, temporary transfers are more appropriate than subsidies and tax cuts, although repeated payments reduce incentives to shift away from expensive energy sources

4) Policy measures should not distort prices such that incentives to dampen energy consumption are preserved

# Implications for economic policy

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The Danish labour market is very tight. At the same time, inflation is at its highest in 40 years

Most evidence suggests that medium- to long-term inflation expectations are well-anchored around 2 per cent

However, inflation expectations are very hard to measure accurately. The longer time inflation remains high while labour markets are tight, the higher is the risk that inflation expectations de-anchor and inflation becomes entrenched.

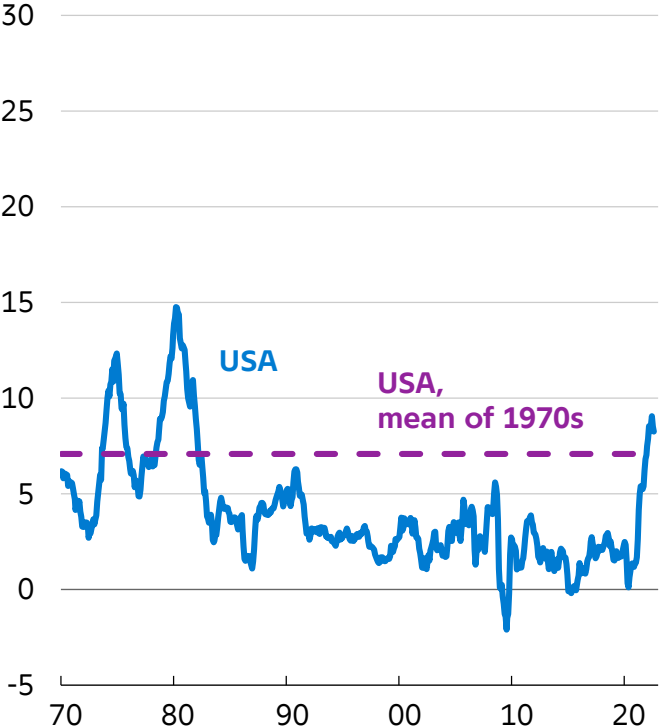
To lean against this risk, we have recommended that fiscal policy for the coming year should be tighter than what the government has currently proposed.



# Comparison to the 1970s – current inflation is around the average in the 1970s in the US and Denmark, but much lower than the peak

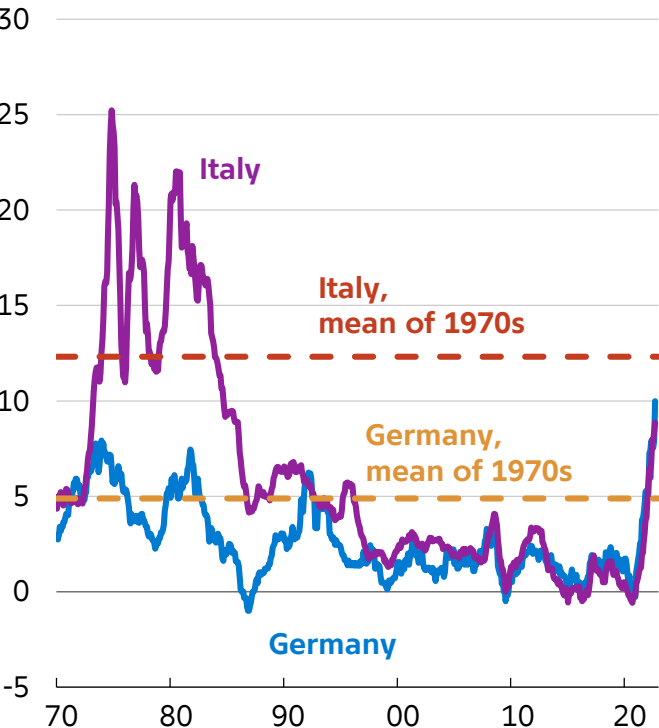
**Inflation in US is slightly higher than the mean level in the 1970s**

Per cent, year-year



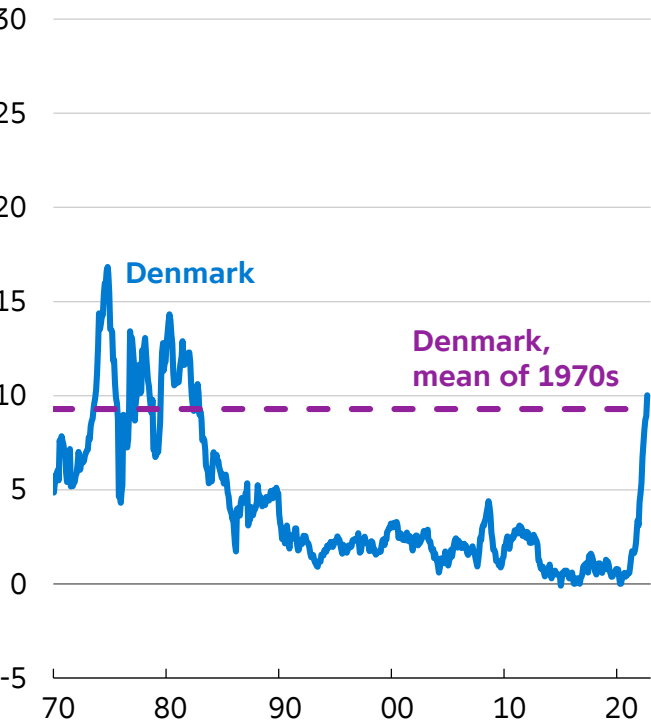
**Inflation in Italy is lower than in the 1970s**

Per cent, year-year



**The inflation in Denmark is slightly above the mean level in the 1970s**

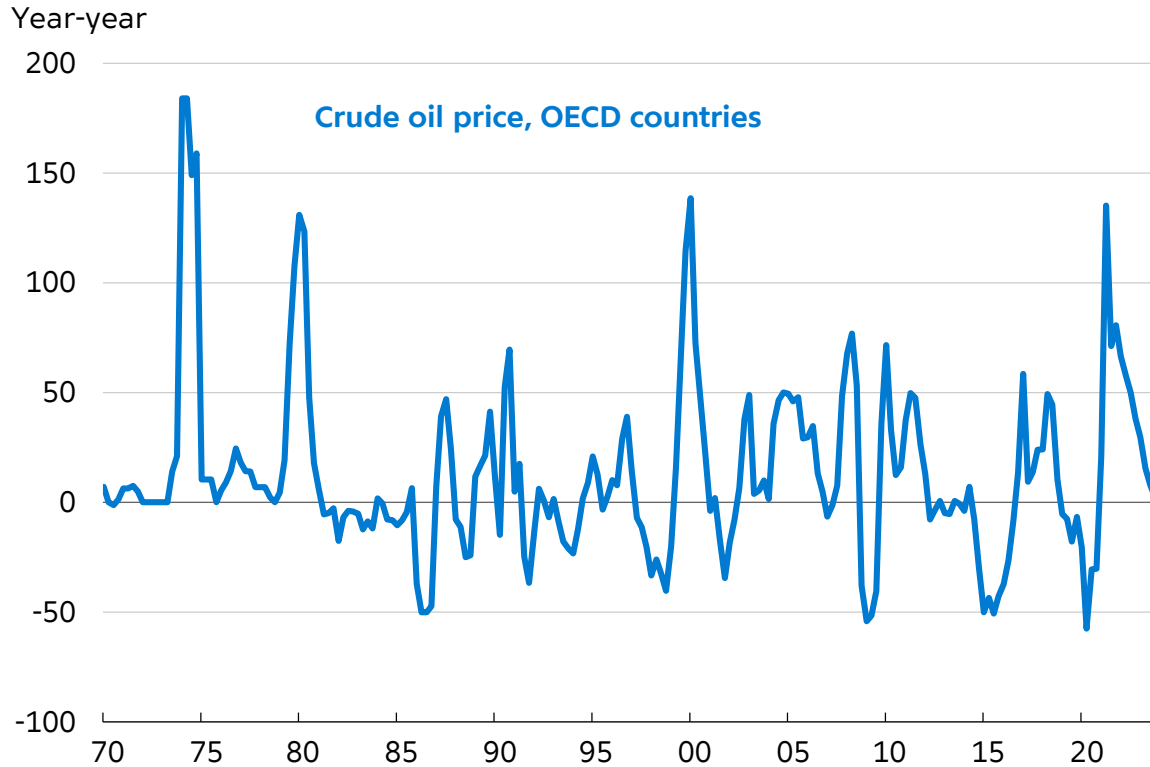
Per cent, year-year



Source: OECD and Macrobond.

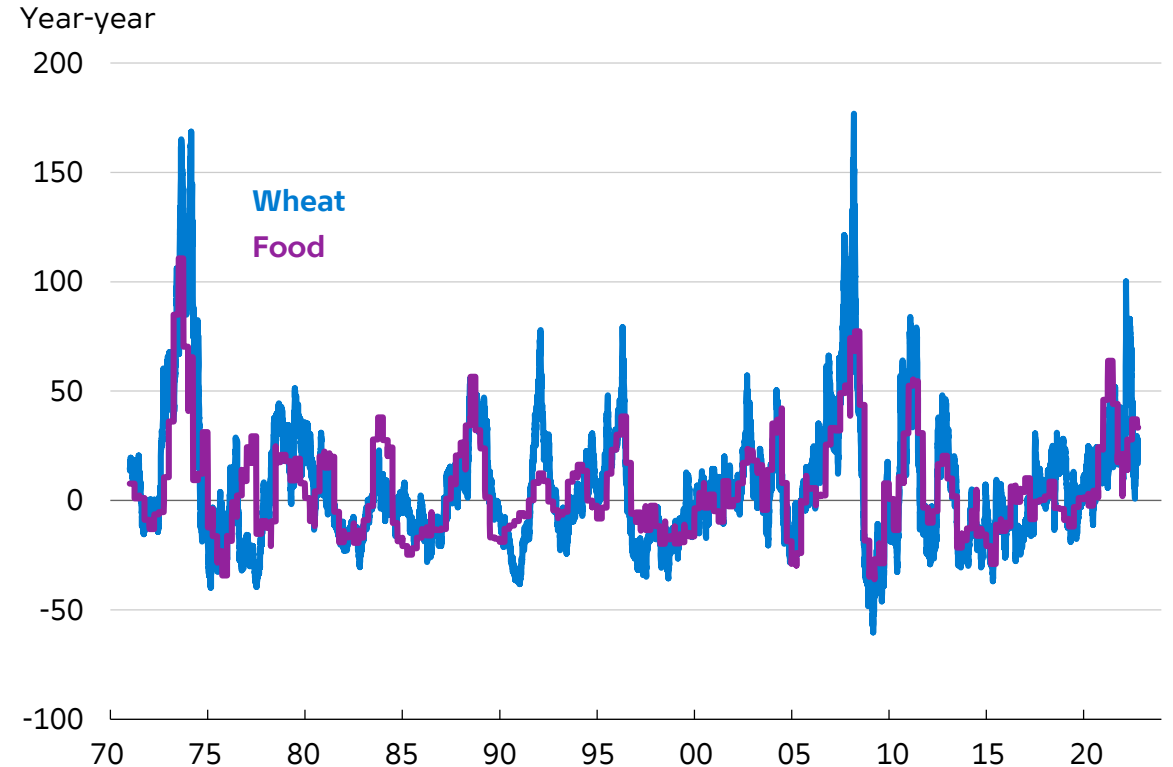
# Similarities to the 1970s – energy and food price shocks....

The oil price has increased substantially as in the 1970s



Note: Crude oil price, USD per Barrel, spot Brent.  
Source: OECD, Macrobond.

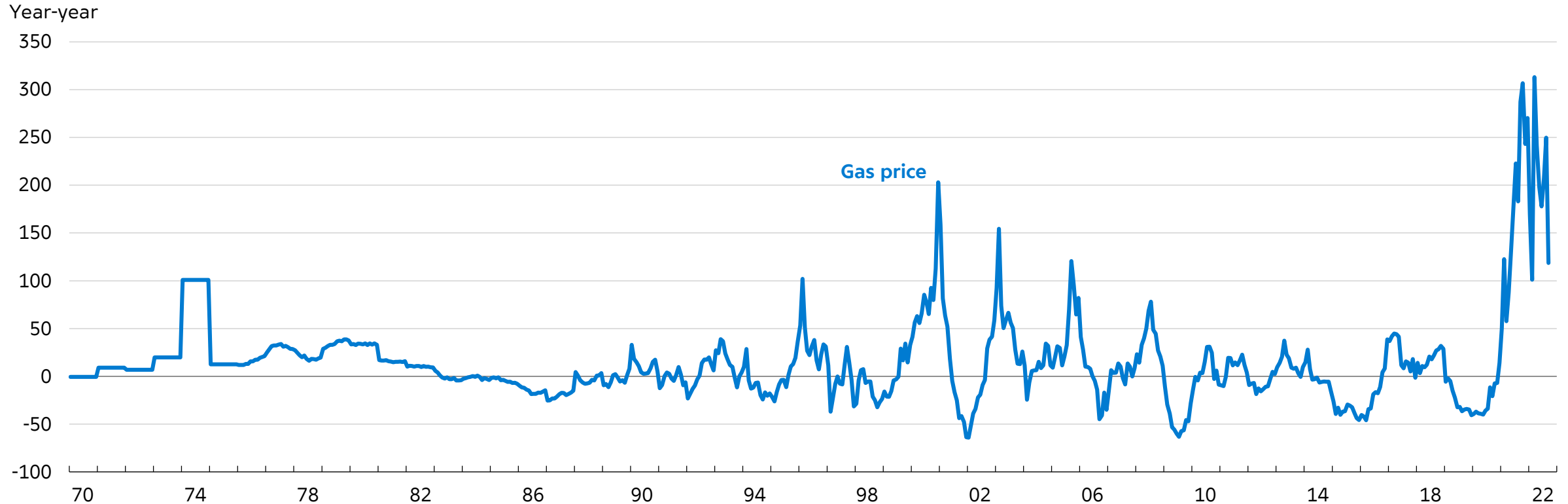
... and the same applies for food and wheat



Note: The Wheat index is from S&P GSCI, Wheat index.  
Source: S&P, HWWI, OECD and Macrobond.

# Differences to the 1970s – but the nature of the energy shock is different

...but gas prices have increased more compared to the 1970's



Note: Index of average world price. Yearly series until 1975.

Source: World Bank and Macrobond.

# Differences to the 1970s – more independent monetary policy regimes

## USA:

Fed's independence was weakened during Nixon/Burns (cf. Bernanke, 2022)

Politicians and Fed had a non-monetary, cost-push view on inflation with limited capacity for monetary policy

Today, the current government respects Fed's independence

Today, Fed believes that inflation can be controlled in the medium run by monetary policy

## Euro area:

Through the 1970s, the Bundesbank had a large degree of independence, while the central banks in France, Italy and Spain were much less independent (cf. Bernhard, 1998).

Today, ECB sees price stability as its primary mandate, and ECB's independence is determined by the institutional frame through the treaty and the statute.

## Denmark:

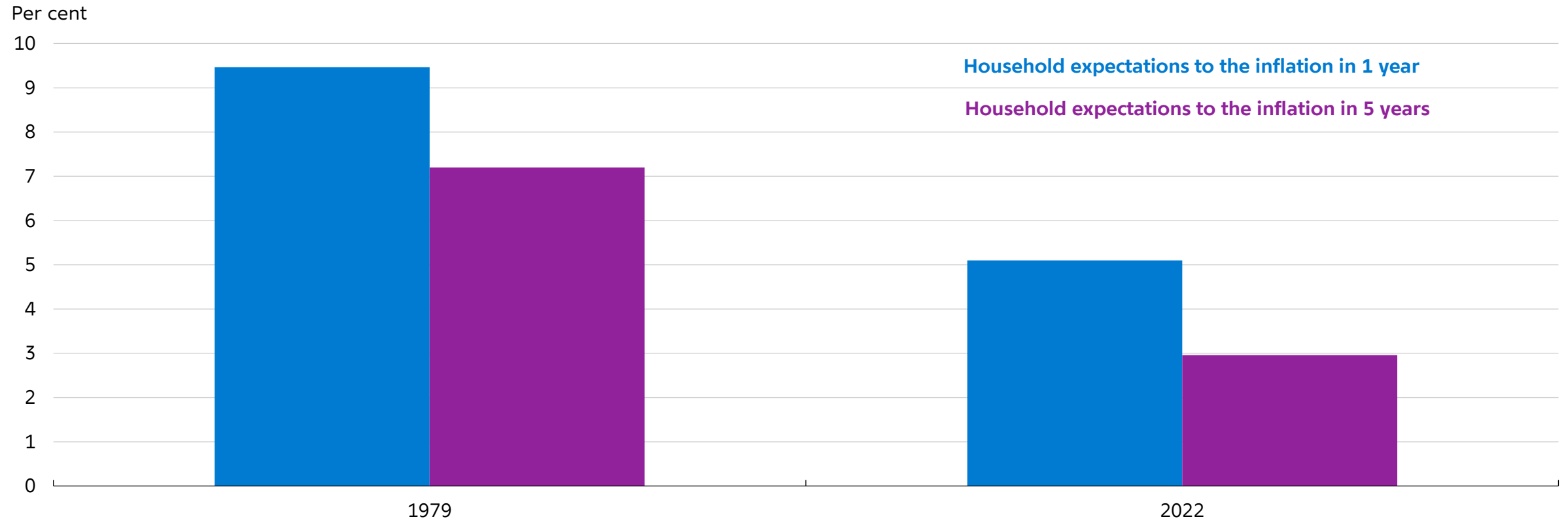
Through the 1970s and the early 1980s monetary stability was lost in Denmark. Policy mistakes contributed to a sharp increase in inflation and consecutive governments resorted to devaluating DKK.

This changed after the shift to a fixed exchange rate regime in 1982.

Today there is a high degree of credibility concerning the fixed exchange rate and economic policies in general.

# Differences to the 1970s – the medium-term inflation expectations are more well-anchored

Medium-term inflation expectations were de-anchored in the end of the 1970s in the US, which is different today

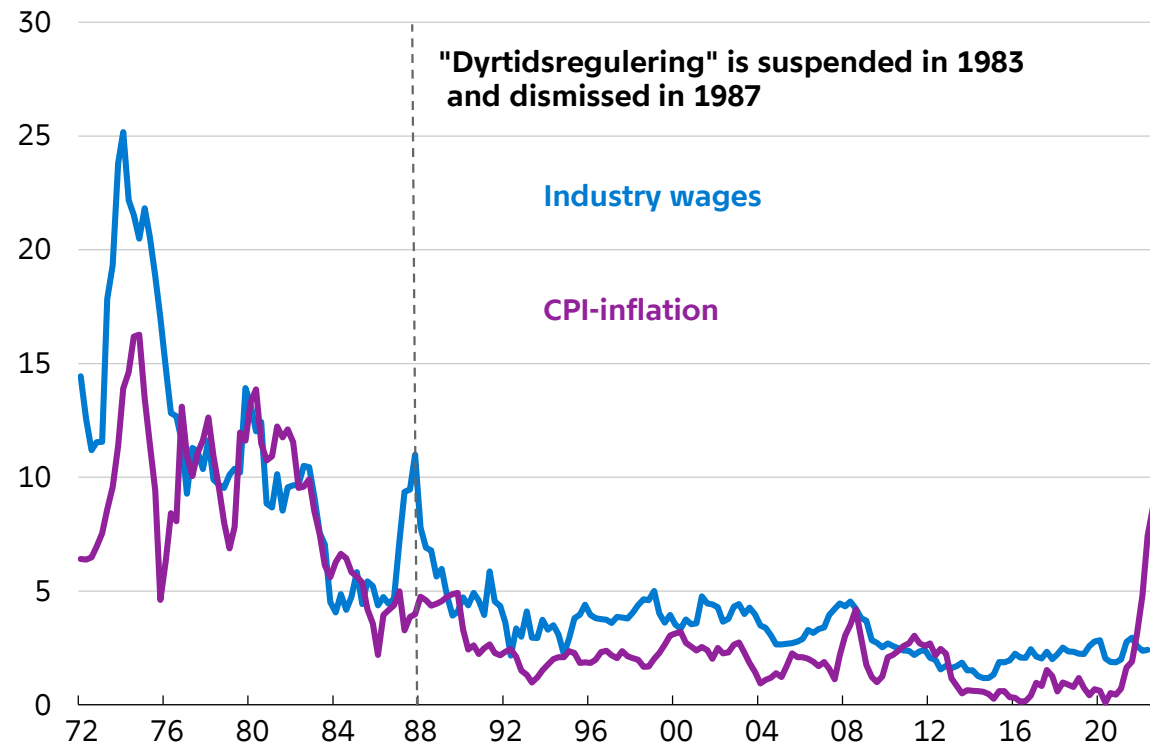


Note: The chart shows survey-based inflation expectations from University of Michigan's consumer survey.  
Source: Macrobond and own calculations.

# Differences to the 1970s – Lower propagation of wage indexation but high inflation creates risk of a wage-price spiral

## Government program “Dyrtidsregulering” nourished a wage-price spiral in Denmark through the 1970s in Denmark

Per cent, year-on-year

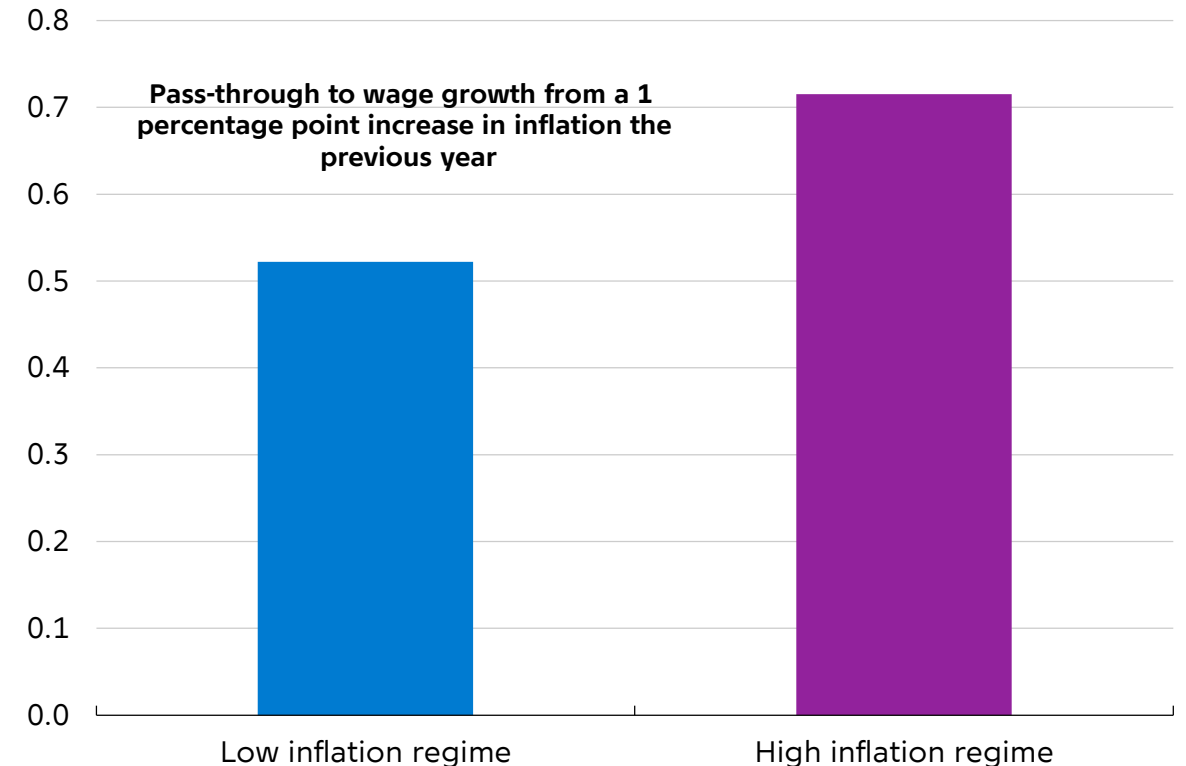


Note: “Dyrtidsregulering” was a programme regulating wages and some public services automatically in accordance with inflation.

Source: Macrobond, Danmarks Nationalbank, Statistics Denmark and own calculations.

## Wages react stronger to rising prices when inflation is high

Percentage points



Note: A high inflation regime is a period with inflation above 3 pct. Pass-through is estimated via a regression model, where wage growth in industry is explained by inflation, unemployment gap, and the productivity growth the year before 1st quarter 1985 – 2nd quarter 2022.

Source: Macrobond, Danmarks Nationalbank, Statistics Denmark and own calculations.

# Conclusion

## 1) There are significant differences between inflation in the US, the euro area and Denmark

Services is the dominant factor in US inflation

Energy is the most important factor in the euro area and Denmark but food prices are also important

## 3) Where are we heading?

Weaker global growth, tighter monetary policy, improving conditions for global goods supply and well-anchored inflation expectations suggest inflation will head lower in coming years.

## 5) Implications for economic policy

To lean against the risk that inflation expectations de-anchor and inflation becomes entrenched, we recommend that fiscal policy should be tightened.

## 2) Why are we here?

The nature of the crisis, the US fiscal boost, supply disruptions and the energy shock are key drivers.

Currently, supply disruptions are centered around energy in Europe and the labour market in the US.

## 4) A special focus on Denmark

High inflation is primarily due to energy, but cyclical factors also play a role due to an upward sloping Phillips curve

Lower energy prices and tariffs pose downside risk to our 2023 forecasts but upside risks to our 2024 forecasts

## 6) There are major differences to the 1970s

Centralbanks are more independent, inflation expectations are more well-anchored and there are lower propagations of wage indexation

# Thank you

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# References

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